02-8802-13-SI
REV. NO. 0

FINAL DRAFT
SITE INSPECTION REPORT
OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, SUFFOLK COUNTY, NEW YORK

PREPARED UNDER
TECHNICAL DIRECTIVE DOCUMENT NO. 02-8802-13
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

AUGUST 7, 1989

NUS CORPORATION
SUPERFUND DIVISION

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338018

SITE NAME:	Oakville Drum Site (LILCO)	**EPA ID NO.:**	NYD981186893
ADDRESS:	Access Road Off County Route 104 Southampton, Suffolk County, New York 11769	**LATITUDE:**	40° 52' 50" N
		LONGITUDE:	72° 38' 05" W
		BLOCK:	1
		LOT:	7.1

1.0 SITE SUMMARY

The Oakville Drum Site is located approximately 3300 feet southeast of the intersection of Riverhead Road and Route 104, formerly Route 113, in the town of Southampton, Suffolk County, New York. The site property is currently owned by the Flanders Associates, who purchased the property from WJF Corporation in 1986. Also, the Long Island Lighting Company (LILCO) owns a right-of-way across the property. The site contains 114 drums, in various states of deterioration, which have been abandoned in two areas of the property. The property is a pine barrens area which is used by local residents for recreational purposes such as motorcycling and possibly wildlife and bird watching.

The first cluster of drums is staged along a sandy access road in the southeast portion of the site. This cluster contains 55 drums of which several contained a viscous material which was observed to be leaking onto the soil. Most of the drums contained an asphalt-like material, and a few contained a white powder. These drums are currently marked by numbers, although the drum labels themselves are no longer legible. The drums apparently had legible labels in 1983 during an inspection by the New York State Department of Environmental Conservation (NYSDEC) and were identified to belong to the New York State Department of Public Works (NYSDPW). This department has been dissolved since 1968. The New York State Department of Transportation (NYSDOT) visited the drum site and indicated that the powder waste is "Stayright" (a curing compound for cement) and the asphalt-type waste is ordinary "crack and joint sealer" that is used on roads. The second drum cluster mostly contained the same materials, although a few of the drums were observed to have several different labels. One drum had a "CYANAMID" label, one drum was labeled PERMAG, SPECIALIZED SCIENTIFIC CLEANERS FOR EVERY INDUSTRIAL PURPOSE", and another drum was labeled "MIEL DE ABEJAS, BRUTO, TARA, NETO". (This translates to bee honey). The second cluster contains 59 drums which are spread out along the LILCO right-of-way in several smaller piles in the northwest portion of the site. NYSDOT believes that the abandoned drums were left behind by the contractor who built the Sunrise Highway in the early 1970s. Each drum cluster occupies an area of approximately one-half acre and the clusters are estimated to be located 2000 feet apart from each other.

The site area is unfenced on the northern side, where it can be entered by an access road located about 3300 feet southeast of the intersection of Riverhead Road and Route 104. The access road runs south of the junction of Riverhead Road and Route 104 and intersects the LILCO transmission line corridor. The site is relatively flat as the regional slope is about 1 percent to the north towards Flanders Bay and about 1 percent to the south towards Shinnecock Bay. Groundwater is the sole source of water for public supply, agriculture, and industry. The nearest residence (and private well) is located approximately 0.57 mile west of the site on Riverhead Road. The nearest downslope surface water (an unnamed tributary to Quantuck Creek) is located about 1.61 miles southeast of the site. The site has not been cleaned up to date, and the drums are still strewn about the site and are deteriorating. However, the U.S. Environmental Protection Agency (EPA) is actively preparing to remove the drums.

On January 25, 1989, NUS Corporation, FIT 2 personnel performed a site inspection and collected six soil samples from the base of the drums in stained soil areas. Results from the inorganic analyses of the samples collected indicated that the soils contained heavy metals. The organic analyses of the soil samples were determined to be invalid because the samples were not analyzed properly in the required time period as established by EPA guidelines. On May 9, 1989, NUS Corporation FIT 2 personnel performed another sampling event and collected six soil samples from the same locations as the original sampling performed on January 25, 1989. The samples were analyzed for organic compounds only, and were found to contain the volatiles toluene and xylene, and the pesticide aldrin. Several semivolatiles were detected but the samples were reported only as "J" values. "J" indicates the value was detected below contract-required detection limits but above the instrument detection limit for the sample. The detection limits for samples may vary based on the dilution factor of the sample.

Ref. Nos. 1, 2, 4, 9, 10, 11, 12, 13

2.0 SITE INSPECTION NARRATIVE

2.1 EXISTING ANALYTICAL DATA

The drums were previously sampled by EA Science and Technology on September 15, 1987. The results indicated the presence of PCBs and pesticides, but the analyses did not pass QA/QC procedures. One sample was collected and analyzed by Pedneault Associates, Inc. on November 9, 1988. The sample was analyzed for EP Toxicity heavy metals. The sample was reportedly a mixture of waste products such as tar, asphalt, and waste stillbottoms collected from drums in the first cluster. The results from the analysis of the sample collected indicated 0.002 mg/L of cadmium and 0.093 mg/L of chromium. There are no QA/QC data available for the sample analysis.

Ref. Nos. 6, 7

2.2 WASTE SOURCE DESCRIPTION

The site contains 114 drums, in various states of deterioration, which have been abandoned in two areas of the property. Many of the drums were observed to be leaking or spilling contaminants to the ground. The New York State Department of Transportation (NYSDOT) has visited the site and indicates that the powder waste is "Stayright" (a curing compound for cement) and the asphalt-type waste is ordinary liquid and solidified "crack and joint sealer" that is used on roads. NYSDOT believes that these drums were left behind by the contractor who built the Sunrise Highway in the early 1970s. The asphalt-type waste is suspected to contain organics.

In 1983, the New York State Department of Environmental Conservation (NYSDEC) visited the site and indicated that many of the drums were clearly marked NYSDPW. This agency, the New York State Department of Public Works, was dissolved in 1968. The contractor who built the Sunrise Highway is thought to be the Henderson Brothers of Valley Stream, New York, although the records of the vendors of the drums were lost or destroyed when the NYSDPW was dissolved. Several drums were found in the second drum cluster, along the LILCO right-of-way, which had various other labels such as "CYANAMID", "PERMAG, SPECIALIZED SCIENTIFIC CLEANERS FOR EVERY INDUSTRIAL PURPOSE", and "MIEL DE ABEJAS, BRUTO, TARA, NETO. " There are no previous analytical data or background information on these additional drums.

Ref. Nos. 1, 2

2.3 GROUNDWATER ROUTE

The site is underlain by Pleistocene glacial deposits. These deposits are underlain by the Cretaceous Magothy Formation, then by the Raritan Clay Formation and Raritan Lloyd Sand Formation. These formations are then underlain by Precambrian gneiss and schist bedrock. The ground surface elevation at the site averages approximately 65-75 feet above mean sea level (MSL). The Pleistocene glacial deposit is a major aquifer in Suffolk County; it consists of till and outwash sands and gravels with local variations of clay deposits which could result in different bedding structures in the groundwater flow pathway. The glacial deposits are found to a depth of 100 feet below MSL and uncomformably overlie the sediments of the Cretaceous Magothy Formation on an erosional surface. The Magothy Formation is also a major aquifer in Suffolk County and consists of silts, sands, gravels, and clays, and is reported to be 800 to 1200 feet thick in this area. The underlying Cretaceous sediment and bedrock aquifers are found well below the depth of the freshwater aquifer and are known to be saline contaminated.

The Pleistocene Glacial Aquifer and the Cretaceous Magothy Aquifer act as a single hydrologic unit and are the sole source of water for public supply, agriculture, and industry in Suffolk County. Groundwater flow in the area generally trends to the northeast.

There are three Suffolk County Water Authority (SCWA) wells located within 3 miles of the site. The closest SCWA well is located 2.3 miles southeast from the site along Spinney Road. There are also 10 other SCWA wells, just outside the 3-mile radius, located south of the site along Meetinghouse Road. The closest SCWA wells, Nos. S-23184 and S-53593, located on Spinney Road are 118 feet, 2 inches deep and 161 feet, 8 inches deep, respectively. The other SCWA wells mentioned are between 46 and 78 feet deep. All of the wells identified are screened in the Pleistocene Glacial Aquifer and supply water through an interconnected system to SCWA customers. This facility services 39,500 people in the Westhampton District and 126,000 people in the Port Jefferson District. The number of people served by individual wells is not available, although it is known that many residents in the area do have private wells. The nearest residence and private well are approximately 3,000 feet west of the site, on Riverhead Road. Also, a private well located on Lewis Road in East Quogue approximately 3 miles southeast of the site services 160 people at the East Quogue Mobil Home Estates. The depths for the private wells are not identified. (The well locations have been marked on the 3-mile vicinity map, Ref. No. 10). Approximately 420 acres of land are used for agricultural purposes within a 3-mile radius of the site. However, irrigation wells on agricultural land in Suffolk County are not registered by any regulatory agency, so there are no lists or descriptions of the locations of these wells.

There is a potential for groundwater contamination in the area. Sampling results from the analysis of samples collected by NUS Corporation, FIT 2 personnel on January 25, 1989, and May 9, 1989 indicate the presence of heavy metals, several semivolatiles, petroleum hydrocarbons, and a pesticide in the soils located in stained areas around the drum clusters. No groundwater samples were collected during the site investigation. The drums located at the site have leaked or spilled solid and sludge contaminants to the ground. There are no liners associated with the abandoned drums to contain the contaminants from migrating into the groundwater. The area receives a normal annual total precipitation of 45 inches. The mean annual lake evaporation is 29 inches. This results in a net precipitation of 16 inches for the site area. Also, the permeability of the soil to the groundwater is greater than 10^{-3} cm/sec, and the depth to groundwater in the aquifer of concern is approximately 45 to 55 feet. Therefore, there is a potential for contaminants to migrate into the groundwater, which is the sole source of water for public supply, agricultural, and industrial purposes in Suffolk County.

Ref. Nos. 1 (Sections 4.2, 4.3, Appendix 1.3-1, 1.3-2, 1.3-3, 1.3-4, 1.3-5, 1.5-5), 2, 3, 5, 11, 12

2.4 SURFACE WATER ROUTE

The site is located on eastern Long Island, southeast of Riverhead, at an elevation of approximately 65 to 75 feet above mean sea level (MSL). The site is generally flat and located in a pine barren; all drainage infiltrates into the ground. Regional slope to the north is about 1 percent towards Flanders Bay. Regional slope to the south is about 1 percent toward Shinnecock Bay. There are no streams or drainage pathways located around the site. The area south of the Suffolk County Airport is bounded by two streams (Aspatuck and Quantuck Creeks) that join to form Quantuck Bay to the south. The Quogue Wildlife Refuge ponds and streams, located east of the airport, drain south into Quantuck Creek. Aspatuck Creek also flows south on the western side of Peters Lane. The nearest downslope surface water is an unnamed tributary to Quantuck Creek located 1.6 miles from the site.

The net precipitation for the area is 16 inches per year, and the 1-year 24-hour rainfall is 2.5 inches. The amount of overland runoff from precipitation is negligible because the surface and subsurface soils are highly permeable. Precipitation infiltrates through the unsaturated zone to the water table. Therefore, the surface water consists mainly of groundwater discharge.

There is only low potential for contamination of surface water in the area. There are no surface water drainage pathways located on site as most of the precipitation infiltrates into the groundwater zone. Surface water is used only for recreational purposes

There are no surface water intakes for public water supply located within Suffolk County. There are no coastal wetlands within 2 miles of the site and no freshwater wetlands within 1 mile of the site. The site is located in a pine barren, but critical habitats of endangered species or a national wildlife refuge are not located within 1 mile of the site.

Ref. Nos. 1 (Section 4.2, Appendix 1.3-3, 1.5-6, 1.5-9, 1.5-10), 2, 5, 12, 13

2.5 AIR ROUTE

No readings above background were detected in the ambient air on the OVA or HNu prior to disturbance of the waste sources during the site inspections performed by NUS Corporation FIT 2 personnel on January 25, 1989 and May 9, 1989. However, several of the drums were observed to be leaking or spilling contaminants and staining the soil.

Upon disturbance of the stained soil areas at several locations, NUS Corporation FIT 2 personnel reported detecting the presence of volatiles on their air monitoring equipment. The following is a summary of air readings obtained during the site investigations.*

	Location/Matrix	Air Readings	Comments
•	Drum Number 67	HNu: 1 ppm	
	(White powder material)	OVA: 6 ppm	
•	Drum Number 61	HNu: 0 ppm	
	(Viscous Tar Material)	OVA: 10 ppm	
•	Drum Number 111	HNu: 15 ppm	
	(Viscous Tar Material)	OVA: 8 ppm	
•	Drum Number 55	HNu: 45 ppm	Readings from inside drum
	(Black Tar Material)	OVA: 95 ppm	
•	Drum Number 32	HNu: 9 ppm	
	(Thick Resinous Material)	OVA: 15 ppm	

*Readings are highest levels recorded during both NUS sampling events.

Three of the drums (drum Nos. 67, 61, and 111) are located in the first drum cluster. Drum No. 55 and Drum No. 32 are located in the second drum cluster along the LILCO right-of-way.

A residential area is located approximately 0.50 mile from the site, and the residential population within 4 miles of the site is 15,249. There are no known historic landmarks within 1 mile of the site.

Ref. Nos. 2, 8, 11, 12

2.6 ACTUAL HAZARDOUS CONDITIONS

One hundred and fourteen abandoned drums, in various states of deterioration, are at the site. The drums are thought to contain common road construction materials which were left behind when the Sunrise Highway was built in the early 1970s. The drums contain a powder waste which is thought to be "Stayright" (a curing compound for cement) and an asphalt-type waste which is thought to be liquid and solidified "crack and joint sealer". Several other drums were found in the second drum cluster along the LILCO right-of-way which do not appear to be from the same source as the suspected highway materials. One of the drums was labeled "CYANAMID", another drum was found with a label that read "PERMAG, SPECIALIZED SCIENTIFIC CLEANERS FOR EVERY INDUSTRIAL PURPOSE", and a third drum was found with a label that read "MIEL DE ABEJAS, BRUTO, TARA, NETO".

Sample analysis results from samples collected by NUS Corporation FIT 2 personnel on January 25, 1989 and May 9, 1989 indicate that the soil around the drum clusters is contaminated with heavy metals such as copper and lead. Also, the soil is contaminated with the volatiles xylene and toluene, the semivolatiles benzoic acid, naphthalene and 2-methylnaphthalene, and the pesticide aldrin.

There is a potential for contaminants to migrate into the groundwater. Many of the drums are leaking or spilling contaminants which could easily infiltrate into the groundwater. Groundwater is the sole source of water for public supply in Suffolk County.

There is a potential for direct contact contamination to the public. The drums are abandoned and leaking and are located in a pine barren where access is uncontrolled. A motorcycle rider was observed riding through the drum area.

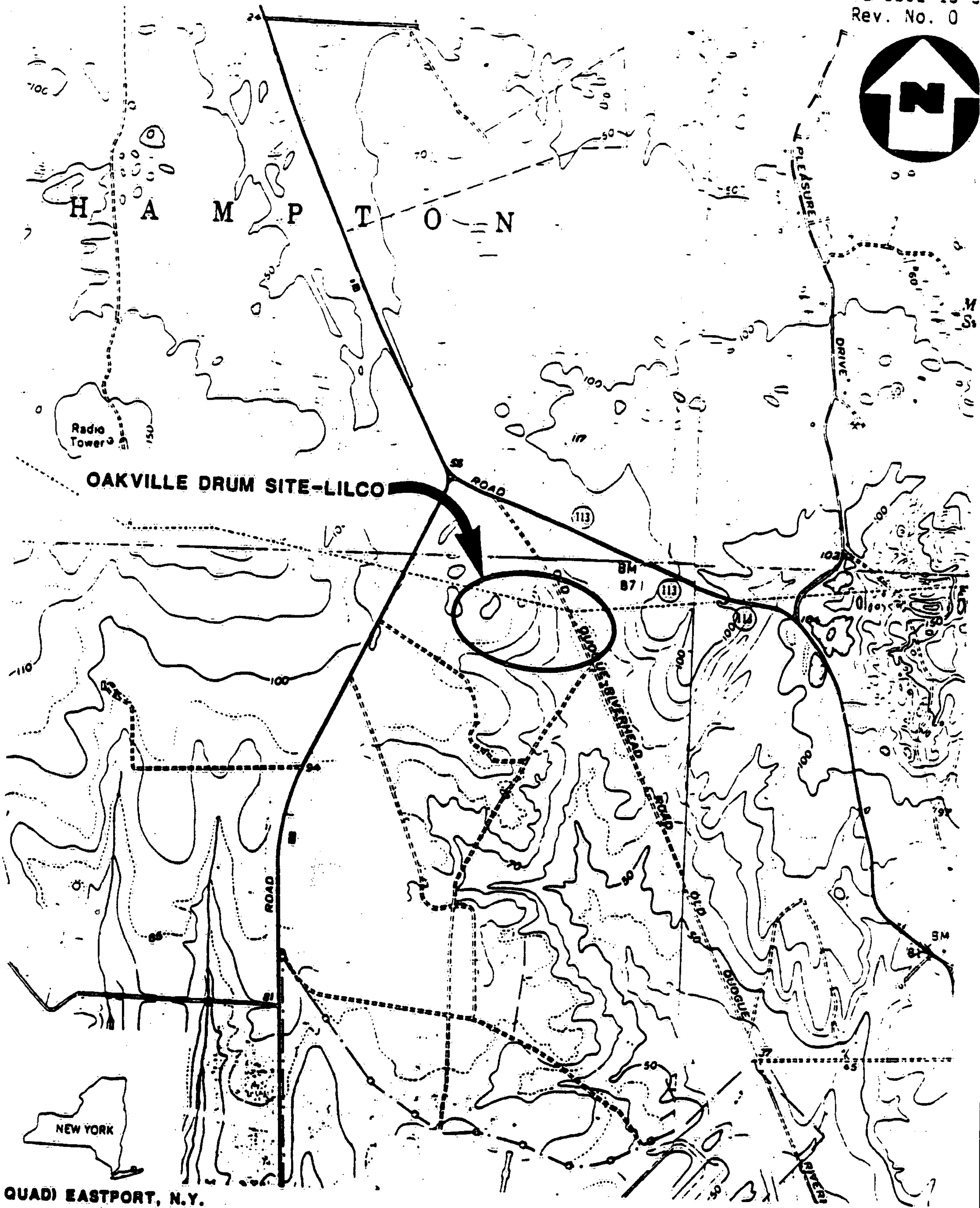
No other actual hazardous conditions pertaining to human or environmental contamination have been documented. Specifically:

- There have been no documented observed incidents of direct physical contact with hazardous substances at the site involving a human being (not including occupational exposure) or a domestic animal.
- Contamination has not been documented either in organisms in a food chain leading to humans or in organisms directly consumed by humans.

- There has been no documented contamination of damage to flora (e.g., stressed vegetation) or to fauna (e.g., fish kill) that can be attributed to the hazardous material at the facility.
- There are no sewers or storm drains in the area.
- A fire marshall has not certified that the facility presents a significant threat as a fire or explosion hazard.

Ref. Nos. 1, 2, 9

3.0 MAPS AND PHOTOS



SITE LOCATION MAP

FIGURE 1

OAKVILLE DRUM SITE-LILCO, SOUTHAMPTON, N.Y.

SCALE: 1 = 2000

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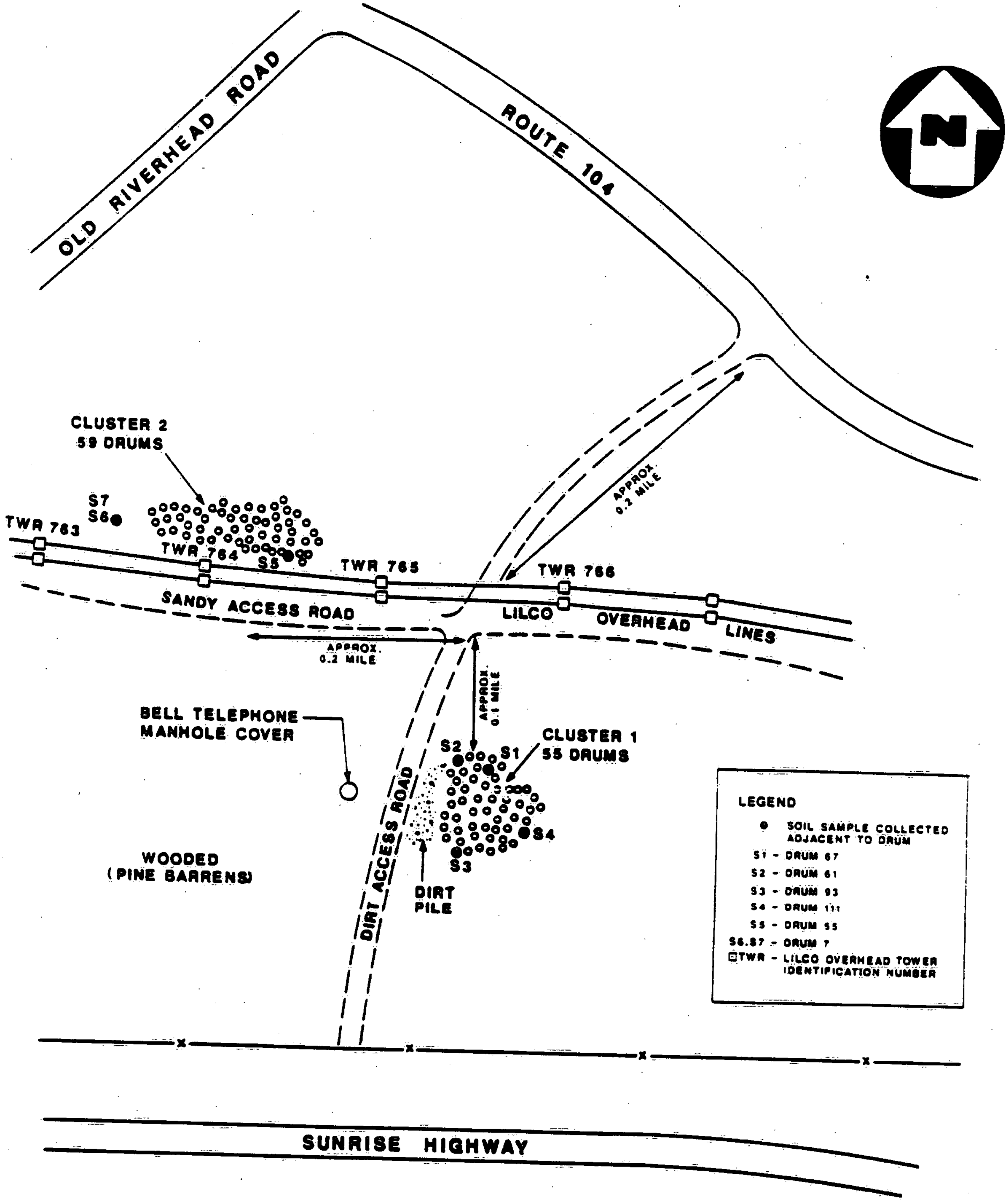

SAMPLE LOCATION MAP

OAKVILLE DRUM SITE-LILCO, SOUTHAMPTON, N.Y.

NOT TO SCALE

FIGURE 2

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EXHIBIT A

PHOTOGRAPH LOG

OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK

OFF-SITE RECONNAISSANCE: MARCH 22, 1988
SITE INVESTIGATION: JANUARY 25, 1989
RESAMPLING: MAY 9, 1989

OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK
MARCH 22, 1988

PHOTOGRAPH INDEX

Photo Number	Description	Time
1P-1	View of access road at northern entrance of site.	0930
1P-2	View of access road traversing east to west along the LILCO right-of-way.	0932
1P-4	View of first drum cluster located in southeastern portion of site.	0936
1P-6	View of additional drums located in first drum cluster.	0938
1P-10	View of drums along the LILCO right-of-way.	0952
1P-11	View of additional drums along the LILCO right-of-way.	1000
1P-12	View of second drum cluster along the LILCO right-of-way.	1001
1P-13	View of additional drums along the LILCO right-of-way.	1002
1P-15	View of isolated drums in the vicinity of the second drum cluster along the LILCO right-of-way.	1004
1P-16	View of a smaller pile of drums located near the second drum cluster along the LILCO right-of-way.	1005

Photos taken by : Bob Nies.

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

1P-1 March 22, 1988 0930
View of access road at northern entrance of site.

1P-2 March 22, 1988 0932
View of access road traversing east to west along the LILCO right of way.

NUS CORPORATION

02-8802-13-SI
Rev. No. 0

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

1P-4 March 22, 1988 0936
View of first drum cluster located in southeastern portion of site.

1P-6 March 22, 1988 0938
View of additional drums located in first drum cluster.

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

1P-10 March 22, 1988 0952
View of drums along the LILCO right of way.

1P-11 March 22, 1988 1000
View of additional drums along the LILCO right of way.

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

1P-12 March 22, 1988 1001
View of second drum cluster along the LILCO right of way.

1P-13 March 22, 1988 1002
View of additional drums along the LILCO right of way.

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

1P-15 March 22, 1988 1004
View of isolated drums in the vicinity of the second drum cluster along the LILCO right of way.

1P-16 March 22, 1988 1005
View of a smaller pile of drums located near the second drum cluster along the LILCO right of way.

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK
JANUARY 25, 1989

Photo Number	Description	Time
2P-2	Photo of Dave Grupp collecting soil sample NYEI-S1 at base of drum No. 67 located in Cluster 1.	1138
2P-3	Photo of Dave Grupp collecting soil sample NYEI-S2 at base of drum No. 61 located in Cluster 1.	1204
2P-4	Photo of Dave Grupp collecting soil sample NYEI-S3 at base of drum No. 93 located in Cluster 1.	1230
2P-5	Photo of Alan Latyn collecting environmental duplicate soil sample NYEI-S6 and NYEI-S7 at base of drum No. 7 located in Cluster 2.	1314
2P-6	Photo of resinous material in drum area where environmental duplicate soil sample NYEI-S6 and NYEI-S7 were collected.	1320
2P-7	Photo of Alan Latyn collecting soil sample NYEI-S5 at base of drum No. 55 located in Cluster 2.	1350
2P-8	Photo of Dave Grupp collecting soil sample NYEI-S4 at base of drum No. 111 located in Cluster 1.	1415
2P-9	Photo of drum No. 111 which shows a liquid tar substance leaking from the lid.	1428
2P-10	Photo of drum No. 111 which shows a liquid tar substance leaking from the lid and staining the soil.	1429
2P-11	Photo of drum located in second drum cluster along the LILCO right of way with the label "MIEL DE ABEJAS, BRUTO, TARA, NETO."	1435
2P-12	Photo of drum located in second drum cluster along the LILCO right of way with the label "CYANAMID".	1440
2P-13	Photo of drum No. 42 located in second drum cluster along the LILCO right of way with the label "PERMAG, SPECIALIZED SCIENTIFIC CLEANERS FOR EVERY INDUSTRIAL PURPOSE".	1442

Photos taken by Joseph Murtaugh.

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

2P-2 January 25, 1989 1138
Photo of Dave Grupp collecting soil sample NYEI-S1 at base of drum No. 67 located in Cluster 1.

2P-3 January 25, 1989 1204
Photo of Dave Grupp collecting soil sample NYEI-S2 at base of drum No. 61 located in Cluster 1.

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

2P-4 January 25, 1989 1230
Photo of Dave Grupp collecting soil sample NYEI-S3 at base of drum No. 93 located in Cluster 1.

2P-5 January 25, 1989 1314
Photo of Alan Latyn collecting environmental duplicate soil sample NYEI-S6 and NYEI-S7 at base of drum No. 7 located in Cluster 2.

NUS CORPORATION

02-8802-13-SI
Rev. No. 0

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

2P-6 January 25, 1989 1320
Photo of resinous material in drum area where environmental duplicate soil sample NYEI-S6 and NYEI-S7 were collected.

2P-7 January 25, 1989 1350
Photo of Alan Latyn collecting soil sample NYEI-S5 at base of drum No. 55 located in Cluster 2.

NUS CORPORATION

02-8802-13-SI
Rev. No. 0

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

2P-8 January 25, 1989 1415
Photo of Dave Grupp collecting soil sample NYEI-S4 at base of drum No. 111 located in Cluster 1.

2P-9 January 25, 1989 1428
Photo of drum No. 111 which shows a liquid tar substance leaking from the lid.

02-8802-13-SI
Rev. No. 0

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

2P-10 January 25, 1989 1429
Photo of drum No. 111 which shows a liquid tar substance leaking from the lid and staining the soil.

2P-11 January 25, 1989 1435
Photo of drum located in second drum cluster along the LILCO right of way with the label "MIEL DE ABEJAS, BRUTO, TARA, NETO".

OAKVILLE DRUM SITE
SOUTHAMPTON, NEW YORK

2P-12 January 25, 1989 1440
Photo of drum located in second drum cluster along the LILCO right of way with the label "CYANAMID".

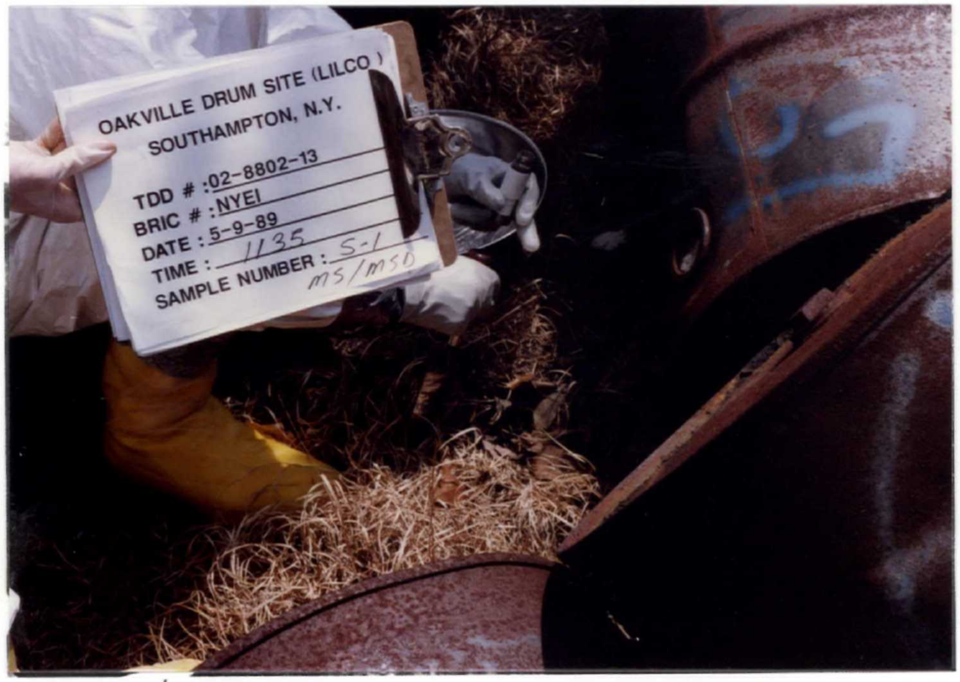
2P-13 January 25, 1989 1442
Photo of drum No. 42 located in second drum cluster along the LILCO right of way with the label "PERMAG, SPECIALIZED SCIENTIFIC CLEANERS FOR EVERY INDUSTRIAL PURPOSE.

RESAMPLING OF OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK
MAY 9, 1989

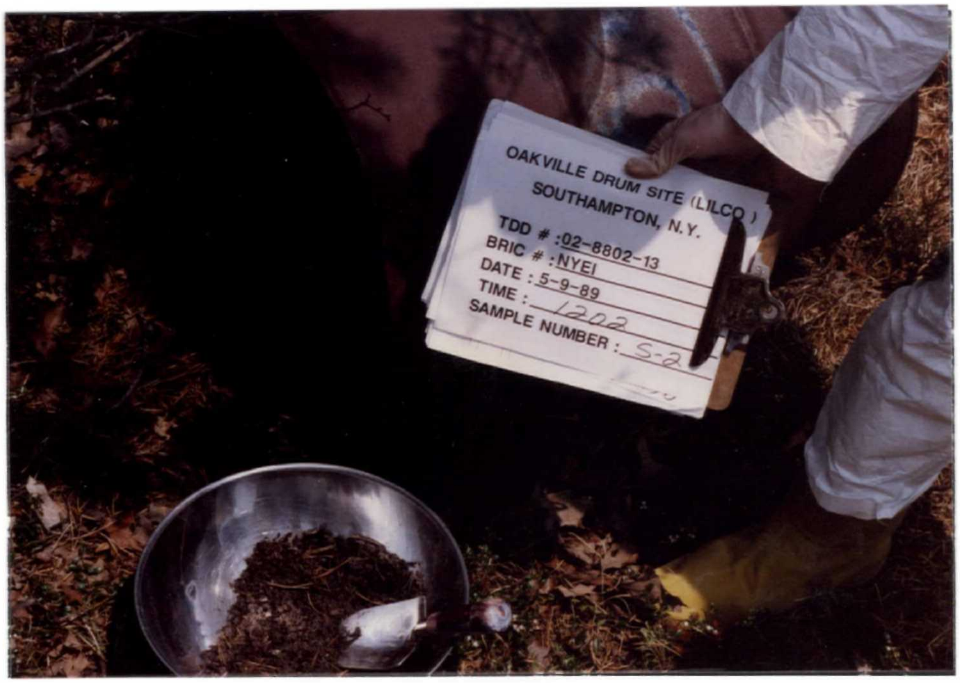
Photo Number	Description	Time
3P-1	Photo of Rich Pagano collecting soil sample NYEI-S1.	1135
3P-2	Photo of Gerald Hannay collecting soil sample NYEI-S2.	1202
3P-3	Photo of Rich Pagano collecting soil sample NYEI-S4.	1240
3P-4	Photo of Rich Pagano collecting soil sample NYEI-S3.	1248
3P-5	Photo of Rich Pagano collecting environmental duplicate soil sample NYEI-S7.	1347
3P-6	Photo of Jeff Hannay collecting environmental duplicate soil sample NYEI-S6.	1348
3P-7	Photo of Rich Pagano collecting soil sample NYEI-S5.	1409

Photos taken by Joseph Murtaugh.

RESAMPLING OF OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK



3P-1 May 9, 1989 1135
Photo of Rich Pagano collecting soil sample NYEI-S1.

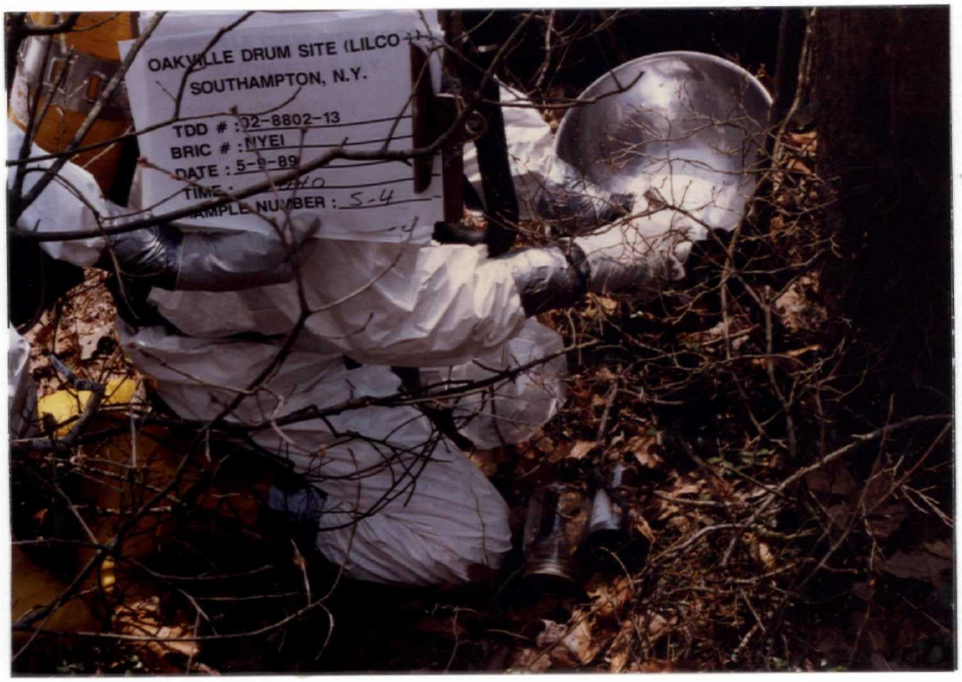


3P-2 May 9, 1989 1202
Photo of Gerald Hannay collecting soil sample NYEI-S2.

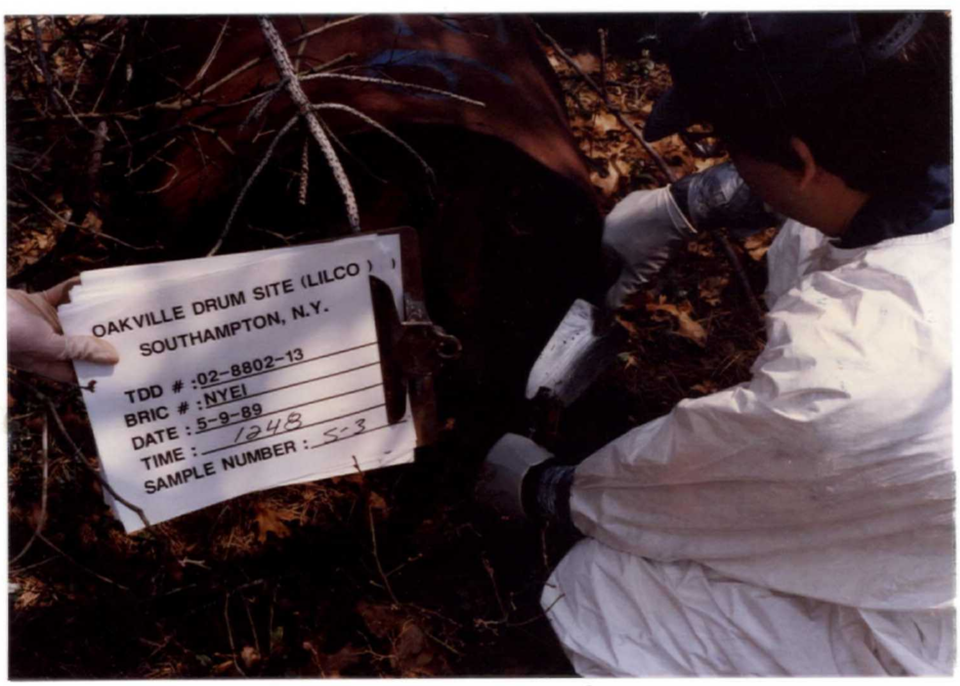
NUS CORPORATION

02-8802-13-SI
Rev. No. 0

RESAMPLING OF OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK

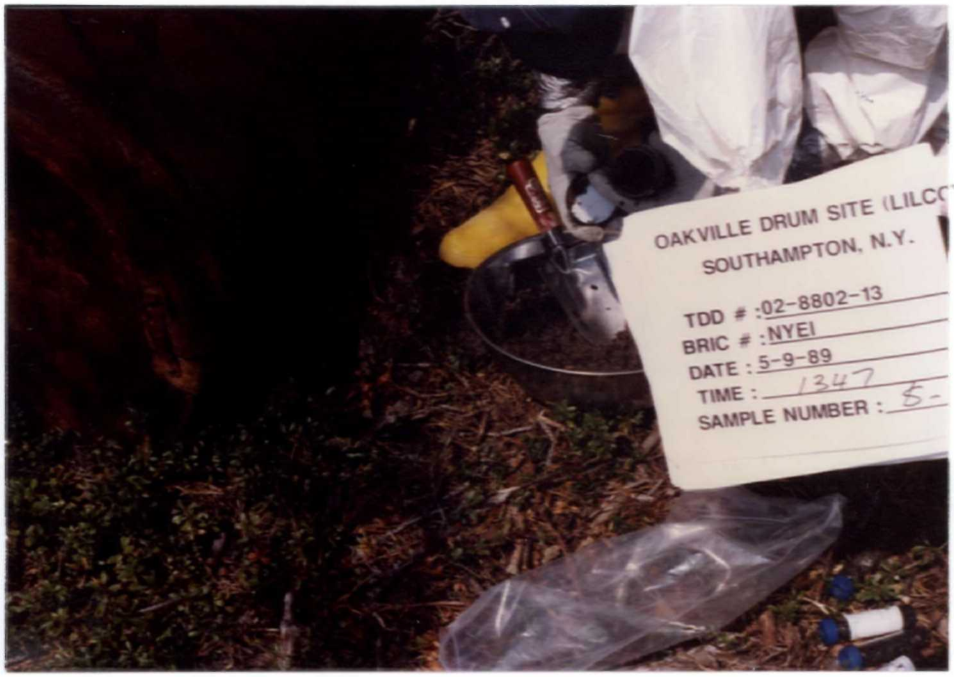


3P-3 May 9, 1989 1240
Photo of Rich Pagano collecting soil sample NYEI-S4.



3P-4 May 9, 1989 1248
Photo of Rich Pagano collecting soil sample NYEI-S3.

RESAMPLING OF OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK



3P-5 May 9, 1989 1347
Photo of Rich Pagano collecting environmental duplicate soil sample NYEI-S7.

3P-6 May 9, 1989 1348
Photo of Jeff Hannay collecting environmental duplicate soil sample NYEI-S6.

RESAMPLING OF OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK

3P-7 May 9, 1989 1409
Photo of Rich Pagano collecting soil sample NYEI-S5.

4.0 SITE INSPECTION SAMPLING RESULTS

On January 25, 1989, NUS Corporation, FIT 2 personnel performed a site inspection and collected six soil samples from the bases of the drums in stained soil areas. Results from the analyses of the samples collected indicate that the soils contain levels of heavy metals which are above their typical median concentration in soil. The organic analyses of the soil samples were determined to be invalid because the samples were analyzed after the allowable holding time expired according to EPA Contract Laboratory Program (CLP) guidelines. On May 9, 1989, NUS Corporation FIT 2 personnel performed another site inspection and collected six soil samples from the same locations as the original sampling performed on January 25, 1989. The samples were analyzed for organic compounds only, and were found to contain the volatiles toluene and xylene, the semivolatiles benzoic acid, naphthalene, and 2-methylnaphthalene and the pesticide aldrin. The following is a table summarizing the analytical results. Calcium is listed because it is a possible ingredient in "Stayright".

Table 1

Substance	Sample No.	Dilution Factor	Concentration	Contract Required Detection Limits
Volatiles				
Toluene	NYEI-S6	1	9 E ug/kg	
Xylene	NYEI-S4	1	6,600 E ug/kg	
Semivolatiles				
Benzoic Acid	NYEI-SI	6	300 J ug/kg	2,200 ug/kg
	NYEI-S5	6	1,000 J ug/kg	2,400 ug/kg
Naphthalene	NYEI-S3	1	18,000 J ug/kg	24,000 ug/kg
	NYEI-S4	20	350,000 J ug/kg	700,000 ug/kg
2-Methylnaphthalene	NYEI-S4	20	73,000 J ug/kg	700,000 ug/kg
Pesticides				
Aldrin	NYEI-S2	1	200 ug/kg	
Inorganics				
Calcium	NYEI-S1	1	52,700 mg/kg	
	NYEI-S2	1	1,950 mg/kg	

Table 1 (cont'd)

Substance	Sample No.	Dilution Factor	Concentration
Copper	NYEI-S5	1	114 E mg/kg
Lead	NYEI-S1	1	47.1 mg/kg
	NYEI-S2	1	35.7 E mg/kg
	NYEI-S3	1	31.8 E mg/kg
	NYEI-S5	1	72.3 E mg/kg
	NYEI-S6	1	721 E mg/kg
	NYEI-S7	1	579 E mg/kg

J = estimated value, compound present below CRDL but above IDL.
E = estimated value.

Ref. Nos. 10, 11

5.0 CONCLUSIONS AND RECOMMENDATIONS

A recommendation for the removal of the drums and a postremoval analysis of the soils beneath the drums is given for the Oakville Drum Site (LILCO). Also, the sampling of all residential wells within 1 mile downgradient from the site is recommended. These recommendations are based upon the sample analysis results from samples collected by NUS Corporation, Region 2 FIT on January 25, 1989 and May 9, 1989 and following information obtained for the subsequent report preparation.

- There are 114 drums in various states of deterioration which have leaked and are still located on site. They contain hazardous materials and are located in an uncontrolled area of the pine barrens in Southampton, New York.

- Samples collected from the stained soil areas at the bases of the drums indicate the presence of volatiles, semivolatiles, a pesticide, and heavy metals.

- There is a direct contact potential. The site area is uncontrolled and is known to be used by local residents for recreational activities.

- The groundwater route is an area of concern. Groundwater is the sole source of water for public supply in Suffolk County. There is a private well located 3,000 feet west of the site on Riverhead Road, and several Suffolk County Water Authority wells are located within 3 miles of the site.

Ref. Nos. 1, 2, 3, 11, 12, 13

6.0 REFERENCES

1. Engineering Investigations at Inactive Hazardous Waste Sites, Phase I Investigation, Oakville Drum Site No. 1, Site No. 152014A, EA Science and Technology, June 1987.

2. Field Notebook No. 0196, Oakville Drum Site (LILCO), TDD No. 02-8802-13, Off-Site Reconnaissance, March 22, 1988; Site Investigation, January 25, 1989; Resampling Site Investigation, May 9, 1989; NUS Corporation, Region 2 FIT, Edison, New Jersey.

3. Letter from the Suffolk County Water Authority to Mike Gentils, NUS Corp. Suffolk County Water Authority well information, Oakdale, Long Island, New York, June 6, 1988.

4. Property Tax Map No. 216, County of Suffolk, Real Property Tax Servce Agency, Riverhead, Long Island, New York.

5. Uncontrolled hazardous waste site ranking system, A user's manual, 40 CFR, Part 300, Appendix A, 1986.

6. Letter from William W. Esseks, Attorney for Flanders Associates, to Mr. Jeff Gaal, U.S. EPA December 9, 1988.

7. Telecon Note: Conversation between Cecil Johnson, NYSDEC, and Michael Gentils, NUS Corporation, March 21, 1988.

8. General Sciences Corporation, Graphical Exposure Modeling Systems (GEMS). Landover, Maryland, 1986.

9. Letter from Vince Pitruzello, Chief Program Support Branch, to Richard D. Spear, Chief Surveillance and Monitoring Branch, Removal of Drums at the Oakville Drum Site, February 21, 1989.

10. Letter from Darvene Adams, Chief, Superfund Support Section, to Lou Bevilacqua, Chief, Toxic and Hazardous Waste Section, Return of Non-Useable Organic Data Package for Oakville Drum Site, Case No. 11290, April 28, 1989.

11. U.S. EPA Contract Laboratory Program, soil and aqueous organic analysis, Century Laboratories, Inc., May 9, 1989, and soil and aqueous inorganic analysis, Laucks Testing Labs, Inc., January 25, 1989.

12. Three-Mile Vicinity Map, U.S. Department of the Interior, Geologic Survey Topographic Map, 7.5 minute series, Eastport, New York Quadrangle, 1956.

13. Aerial photograph of Oakville Drum Site, Photo No. 3814-46-88, Lockwood, Kessler, and Bartlett, March 24, 1984.

REFERENCE NO. 1

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE 1 INVESTIGATION

Oakville Drum Site [redacted]

Site No. 152014A

Town of Southampton, Suffolk County

Final - June 1987

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
Henry G. Williams, Commissioner

Division of Solid and Hazardous Waste
Norman H. Nosenchuck, P.E., Director

Prepared by:

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

NY7311186893

Preliminary Assessment Review Form

Site Name: Oakville Drumsite #1
Aliases:
Address:
City: Southampton
County: Suffolk
State: NY
Priority Rating Given:
(By State or Contractor)

Agree:
Disagree:
(Check One)

If Disagree, Why?

Other Comments:

Site Status: INACTIVE
Site Description: One hundred + fourteen drums of an asphalt-like chemical and a white powdered chemical have been abandoned on the site. Drums are rusting + some have leaked, groundwater in this area is used for drinking by 19,099. The white powdered chemical is a curing compound for cement material.

Recommendation:
Final (By EPA)

Medium Priority

Reviewer:
Date:

[signature] 11-30-87

EA REPORT DEC63A

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK PHASE I INVESTIGATIONS

OAKVILLE DRUM SITE NO. 1
TOWN OF SOUTHAMPTON, SUFFOLK COUNTY
NEW YORK I.D. NO. 152014A

Prepared for

Division of Solid and Hazardous Waste
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-0001

Prepared by

EA Science and Technology
R.D. 2, Goshen Turnpike
Middletown, New York 10940

A Division of EA Engineering, Science, and Technology, Inc.

June 1987

CONTENTS

Facility name: Oakville Drum Site No. 1

Location: Town of Southampton, Suffolk County

EPA Region: 2

Person(s) in charge of the facility: Unknown

Name of Reviewer: EA Science and Technology Date: 10 March 1986

General description of the facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility, contamination route of major concern; types of information needed for rating; agency action, etc.)

One hundred and fourteen barrels of powdered and asphalt-like material have been abandoned along a dirt road in the pine barren between Riverhead Road and Route 104, in the Town of Southampton. The barrels apparently contain ordinary products that are used to construct and maintain roads, and might have been left behind after the Sunrise Highway was built in the early 1970s.

Scores: S_M = 0 (S_{gw} = 0 S_{sw} = 0 S_a = 0)

S_{FE} = N/A

S_{DC} = 0 Maximum S_M = 40.19

FIGURE 1
HRS COVER SHEET

Ground Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max Score	Ref. (Section)	Ma Pos
1 Observed Release	0 45	1	0	45	3.1	45
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2						
2 Route Characteristics					3.2	
Depth to Aquifer of Concern	0 1 2 3	2	4	6		
Net Precipitation	0 1 2 3	1	3	3		
Permeability of the Unsaturated Zone	0 1 2 3	1	3	3		
Physical State	0 1 2 3	1	3	3		
Total Route Characteristics Score			13	15		
3 Containment	0 1 2 3	1	3	3	3.3	
4 Waste Characteristics					3.4	
Toxicity/Persistence	0 3 6 9 12 15 18	1	0	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	0	8		
Total Waste Characteristics Score			0	26		20
5 Targets					3.5	
Ground Water Use	0 1 2 3	3	9	9		
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	35	40		
Total Targets Score			44	49		44
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			0	57,330		39,6
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} =	0			69.

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max Score	Ref. (Section)	Max possi
1 Observed Release	0 45	1	0	45	4.1	45
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.						
2 Route Characteristics					4.2	
Facility Slope and Intervening Terrain	0 1 2 3	1	0	3		
1-yr. 24-hr. Rainfall	0 1 2 3	1	2	3		
Distance to Nearest Surface Water	0 1 2 3	2	2	6		
Physical State	0 1 2 3	1	3	3		
Total Route Characteristics Score			7	15		
3 Containment	0 1 2 3	1	3	3	4.3	
4 Waste Characteristics					4.4	
Toxicity/Persistence	0 3 6 9 12 15 18	1		18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8		
Total Waste Characteristics Score			0	26		20
5 Targets					4.5	
Surface Water Use	0 1 2 3	3	6	9		
Distance to a Sensitive Environment	0 1 2 3	2	0	6		
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40		
Total Targets Score			6	55		6
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			0	64,350		5,400
7 Divide line 6 by 64,350 and multiply by 100		S_{sw} =	0			8.39

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max Score	Ref (Section)
1 Observed Release	0 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line 1 is 0, the S_a = 0. Enter on line 5. If line 1 is 45, then proceed to line 2.					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
Total Targets Score				39	
4 Multiply 1 x 2 x 3				35,100	
5 Divide line 4 by 35,100 and multiply by 100			S_a = 0		

FIGURE 9
AIR ROUTE WORK SHEET

	S	S^2
Groundwater Route Score (S_{gw})	0	0
Surface Water Route Score (S_{sw})	0	0
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		0
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		0
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}\,/\,1.73 = S_M =$		0

FIGURE 10
WORKSHEET FOR COMPUTING S_M

Maximum $S_M = 40.22$

Fire and Explosion Work Sheet					
Rating Factor	**Assigned Value (Circle One)**	**Multiplier**	**Score**	**Max Score**	**Ref. (Section)**
1 Containment	1 3	1		3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 3	1		3	
Ignitability	0 1 2 3	1		3	
Reactivity	0 1 2 3	1		3	
Incompatibility	0 1 2 3	1		3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1		5	
Distance to Nearest Building	0 1 2 3	1		3	
Distance to Sensitive Environment	0 1 2 3	1		3	
Land Use	0 1 2 3	1		3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
	Total Targets Score			24	
4 Multiply 1 x 2 x 3				1,440	
5 Divide line 4 by 1,440 and multiply by 100	S_{FE} = N/A				

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max Score	Ref. (Section)
1 Observed Incident	0 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	0 1 2 3	1	3	3	8.2
3 Containment	0 15	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 3	5	0	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 1 2 3 4 5	4	8	20	
Distance to a Critical Habitat	0 1 2 3	4	0	12	
Total Targets Score			8	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			0	21,600	
7 Divide line 6 by 21,600 and multiply by 100	S_{DC} =		0		

FIGURE 12
DIRECT CONTACT WORK SHEET

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible, summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Oakville Drum Site No. 1

LOCATION: Town of Southampton, Suffolk County

DATE SCORED: 10 March 1986

PERSON SCORING: EA Science and Technology

PRIMARY SOURCE(S) OF INFORMATION (e.g., EPA region, state, FIT, etc.)

Suffolk County Department of Health Services
New York State Department of Transportation
New York State Department of Environmental Conservation, Region 1
EA Site Inspection, 21 January 1986

FACTORS NOT SCORED DUE TO INSUFFICIENT INFORMATION:

COMMENTS OR QUALIFICATIONS:

HRS scoring has been developed because one constituent of the waste is "road tar" (liquid and solidified crack and joint sealer). No analytical data is available, but the substance could contain organics.

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

No analytical data available (Chapter 3).

Assigned value = 0.

Reference: 1.

Rationale for attributing the contaminants to the facility:

***

2 ROUTE CHARACTERISTICS

<u>Depth to Aquifer of Concern</u>

Name/description of aquifer(s) of concern:

Pleistocene Age glacial deposits bounded by a 3-mi radius.

References: 2 and 3.

Depth(s) from the ground surface to the highest seasonal level of the saturated zone (waste table[s]) of the aquifer of concern:

45-55 ft.

References: 4 and 5.

Depth from the ground surface to the lowest point of waste disposal/storage:

0 ft. Abandoned drums on ground surface.

References: 6 and 7.

Depth to aquifer of concern is 45-55 ft.

Assigned value = 2.

Reference: 1.

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual precipitation = 45 in.

Reference: 8.

Mean annual lake or seasonal evaporation (list months for seasonal):

Net precipitation (subtract the above figures):

Mean annual infiltration = 22 in.

Reference: 8.

Assigned value = 3.

Reference: 1.

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Sand and gravel.

Reference: 9.

Permeability associated with soil type:

$>10^{-3}$ cm/sec.

Assigned value = 3.

Reference: 1.

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Unknown at time of disposal. Sludge and powder at present.

Reference: 7.

Assigned value = 3.

Reference: 1.

***

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Containers: abandoned drums.

References: 6 and 7.

Method with highest score:

Containers leaking and no liner.

References: 6 and 7.

Assigned value = 3.

Reference: 1.

***

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Drums contain "Stayright" powder, a curing compound for cement material and on asphalt "crack and joint sealer." No analytical data available.

References: 8, 10, and 11.

Assigned value = 0.

Reference: 1.

Compound with highest score:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

113 55-gal drums of potentially hazardous materials. No analysis has been performed on these substances.

Reference: 7.

Assigned value = 0.

Reference: 1.

Basis of estimating and/or computing waste quantity:

Visual count.

Reference: 7.

***

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Drinking water. No municipal water from alternate unthreatened sources presently available.

References: 12-14.

Assigned value = 3.

Reference: 1.

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

West of the site along Riverhead Road.

References: 5, 13, and 14.

Distance to above well or building:

2,400 ft.

Reference: 5.

Assigned value = 3.

Reference: 1.

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Community Supplies:	Population:
Suffolk County Water Authority	
Westhampton Beach Water District	
(Spinney Rd. well field)	18,939
East Quogue Mobil Home Estates	160
	19,099

An undetermined number of domestic wells exist within the aquifer of concern within a 3-mi. radius of the site.

References: 12-16.

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

Approximately 420 acres of land are used for agricultural purposes within a 3-mi. radius of the site. However, irrigation wells on agricultural land in Suffolk County are not registered by any regulatory agency, so there are no lists or descriptions of the locations of these wells.

References: 17-21.

Total population served by ground water within a 3-mile radius:

19,099.

References: 12-21

Assigned value = 5.

Combined assigned value = 35.

Reference: 1.

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

No data available (Chapter 3).

Assigned value = 0.

Reference: 1.

Rationale for attributing the contaminants to the facility:

***

2 ROUTE CHARACTERISTICS

<u>Facility Slope and Intervening Terrain</u>

Average slope of facility in percent:

0 percent.

Reference: 7.

Name/description of nearest downslope surface water:

Unnamed tributary to Quantuck Creek.

Reference: 5.

Average slope of terrain between facility and above-cited surface water body in percent:

<1 percent.

Reference: 5.

Is the facility located either totally or partially in surface water?

No.

Reference: 7.

Is the facility completely surrounded by areas of higher elevation?

No. Reference: 5.

Assigned value = 0.

Reference: 1.

<u>1-Year, 24-Hour Rainfall in Inches</u>

2.8 in.

Assigned value = 2.

Reference: 1.

<u>Distance to Nearest Downslope Surface Water</u>

1.6 mi.

Reference: 5.

Assigned value = 1.

Reference: 1.

<u>Physical State of Waste</u>

Unknown at time of disposal. Sludge and powder at present.

Reference: 7.

Assigned value = 3.

Reference: 1.

***

3 CONTAINMENT

<u>Containment</u>

Method(s) of waste or leachate containment evaluated:

Containers: abandoned drums.

References: 6 and 7.

Method with highest score:

Containers leaking and no liner.

References: 6 and 7.

Assigned value = 3.

Reference: 1.

***

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

Drums contain "Stayright" powder, a curing compound for cement material and an asphalt "crack and joint sealer." No analytical data available.

References: 8, 10, and 11.

Assigned value = 0.

Reference: 1.

Compound with highest score:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

One hundred fourteen 55-gal drums of potentially hazardous materials. No analysis has been performed on these substances.

Reference: 7.

Assigned value = 0.

Reference: 1.

Basis of estimating and/or computing waste quantity:

Visual count.

Reference: 7.

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Recreation.

Reference: 22.

Assigned value = 2.

Reference: 1.

Is there tidal influence?

Yes.

Reference: 5.

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

>2 mi.

Reference: 5.

Distance to 5-acre (minimum) freshwater wetland, if 1 mile or less:

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None.

Reference: 23.

Assigned value = 0.

Reference: 1.

Population Served by Surface Water

Location(s) of water supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static waterbodies) downstream of the hazardous substance and population served by each intake:

On Long Island, surface water is not used for drinking or irrigation purposes.

Assigned value = 0.

References: 13, 18, and 19.

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre).

Total population served:

Name/description of nearest of above waterbodies:

Distance to above-cited intakes, measured in stream miles.

AIR ROUTE

During EA's site inspection on 21 January 1986, total volatiles were measured using a photoionization detector (HNU). No readings above background were recorded. No other analytical data was available in any of the agency files examined (Chapter 3).

Assigned value = 0.

Reference: 1.

1 OBSERVED RELEASE

Contaminants detected:

Date and location of detection of contaminants

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

***

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

***

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi　　0 to 1 mi　　0 to 1/2 mi　　0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) freshwater wetland, if 1 mile or less:

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

FIRE AND EXPLOSION

The local fire marshal has not certified that the site presents a significant fire or explosion threat (Reference: 24). There are no analytical data available in any of the agency files examined (Chapter 3).

1 CONTAINMENT

Hazardous substances present:

Type of containment, if applicable:

***

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

Ignitability

Compound used:

Reactivity

Most reactive compound:

Incompatibility

Most incompatible pair of compounds:

***

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

Basis of estimating and/or computing waste quantity:

***

3 TARGETS

Distance to Nearest Population

Distance to Nearest Building

Distance to Sensitive Environment

Distance to wetlands:

Distance to critical habitat:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

<u>Population Within 2-Mile Radius</u>

<u>Buildings Within 2-Mile Radius</u>

DIRECT CONTACT

1 OBSERVED INCIDENT

Date, location, and pertinent details of incident:

None reported.

Assigned value = 0.

Reference: 1.

***

2 ACCESSIBILITY

Describe type of barrier(s):

Access is unrestricted.

Reference: 7.

Assigned value = 3.

Reference: 1.

***

3 CONTAINMENT

Type of containment, if applicable:

Drums are rusting and some have leaks.

Reference: 7.

Assigned value = 15.

Reference: 1.

***

4 WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

Drums contain "Stayright" powder, a curing compound for cement material and an asphalt "crack and joint sealer." No analytical data available.

References: 8, 10, and 11.

Assigned value = 0.

Reference: 1.

Compound with highest score:

***

5 TARGETS

Population Within 1-Mile Radius

576. Estimated as 7 percent of the population of Riverside-Flanders (5,489) and 6 percent of Westhampton (3,195).

Reference: 25.

Assigned value = 2.

Reference: 1.

Distance to Critical Habitat (of Endangered Species)

None.

Reference: 23.

Assigned value = 0.

Reference: 1.

1. EXECUTIVE SUMMARY

The Oakville Drum Site No. 1 (New York I.D. No. 152014A; EPA No. NY981186893) is located approximately 3,300 ft southeast of the intersection of Riverhead Road and Route 104 in the Town of Southampton, Suffolk County, New York (Figures 1-1 and 1-2, and Photos 1-1 through 1-8). One hundred and fourteen drums, in various states of deterioration, have been abandoned along a dirt road in a pine barren. Most of the drums contained an asphalt-like material, while a few contained a white powder. Record searches by the Suffolk County Real Property Tax Service Agency and by Long Island Lighting Company (LILCO) failed to establish the ownership of the site. The New York State Department of Environmental Conservation (NYSDEC) has been aware of the existence of these drums since about 1983, however, they have not identified the origin or the contents of the drums. The New York State Department of Transportation (NYDSDOT) has visited the Oakville Drum Site No. 1, and indicates that the powder waste is "Stayright" (a curing compound for cement) and the asphalt-type waste is ordinary "crack and joint sealer" that is used on roads. NYSDOT believes that these abandoned drums were left behind by the contractor who built the Sunrise Highway in the early 1970s.

Preliminary HRS scores for this site are as follows: $S_M = 0$ ($S_{gw} = 0$, $S_{gw} = 0$, $S_a = 0$); Fire and Explosion Score (S_{FE}) = N/A; and Direct Contact Score (S_{DC}) = 0. HRS scoring has been developed because one constituent of the waste is "road tar" (liquid and solidified crack and joint sealer). No analytical data is available, but the substance could contain organics. If a release of contaminants to ground water and surface water can be documented, the maximum attainable S_M is 40.18.

In order to prepare a final HRS score for this site, analytical data regarding the quality of the ground water will be necessary, thus requiring performance of a Phase II investigation. The proposed Phase II study would include performance of geophysical surveys, the installation of four test borings/monitoring wells, and the collection and analysis of ground-water, sediment, and drum content samples. The estimated cost of the proposed Phase II study is $91,095.

Coordinates:
Longitude: 40° 52' 47.4"
Latitude: 72° 37' 49"

OAKVILLE DRUM SITE No. 1

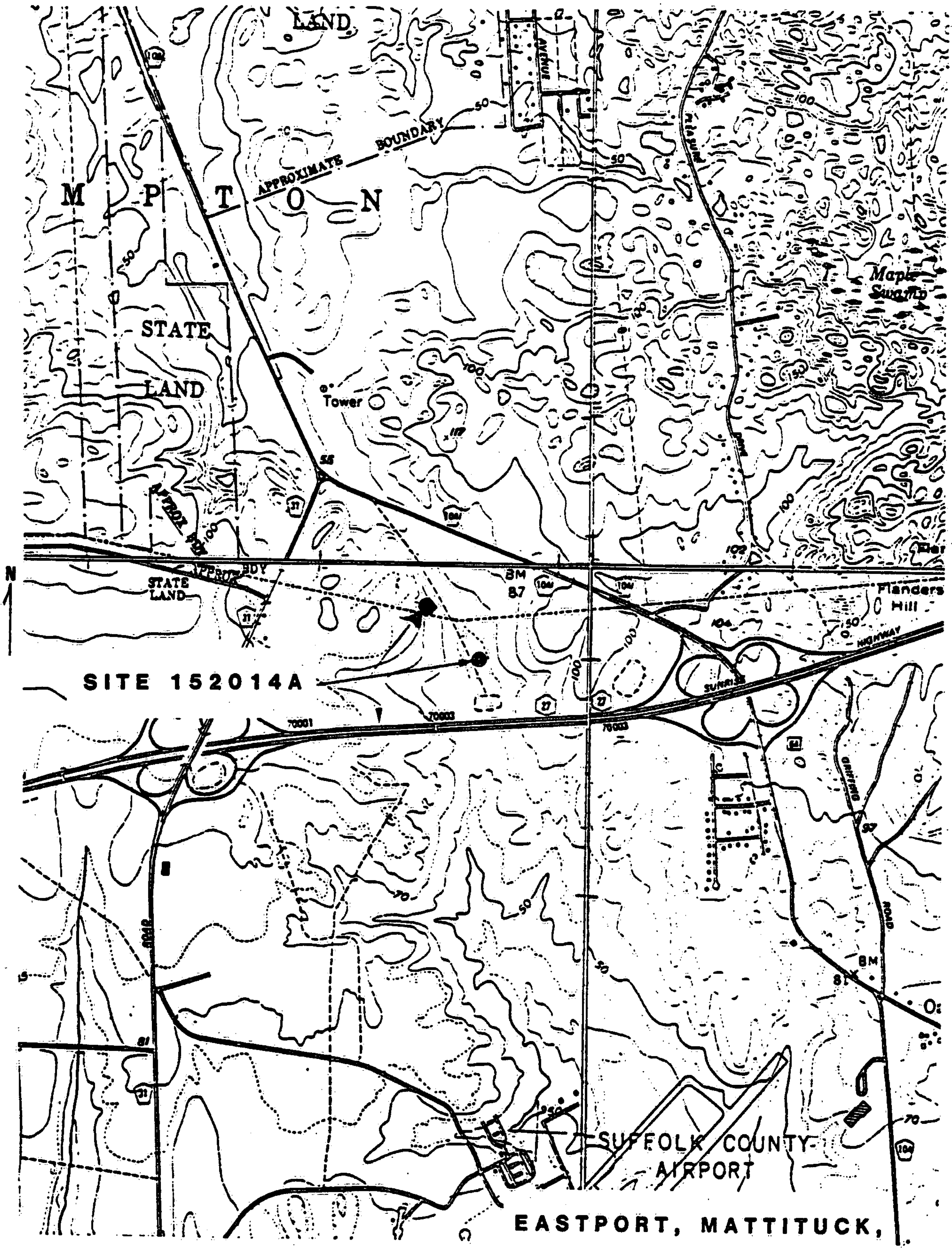
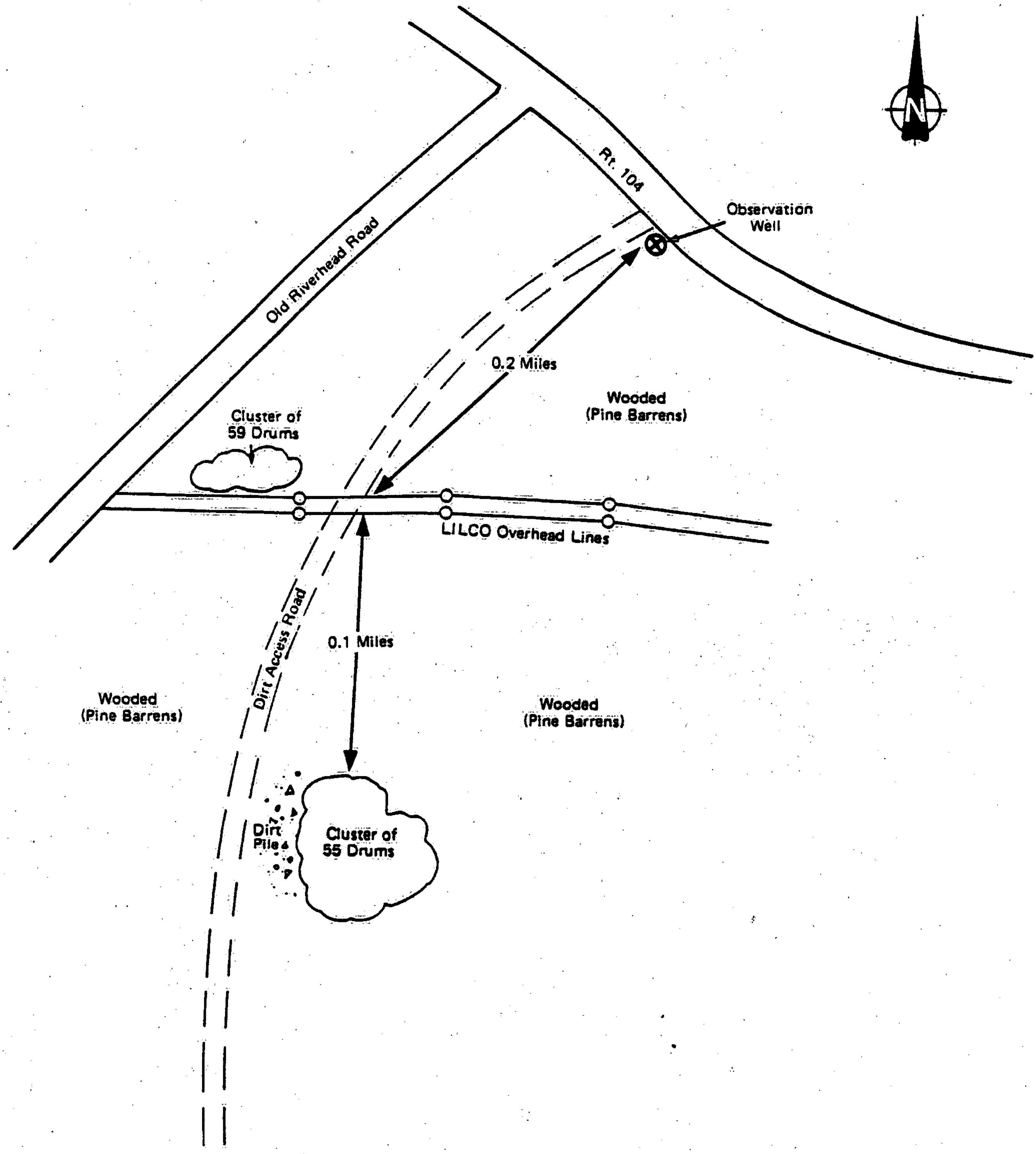


Figure 1-1.

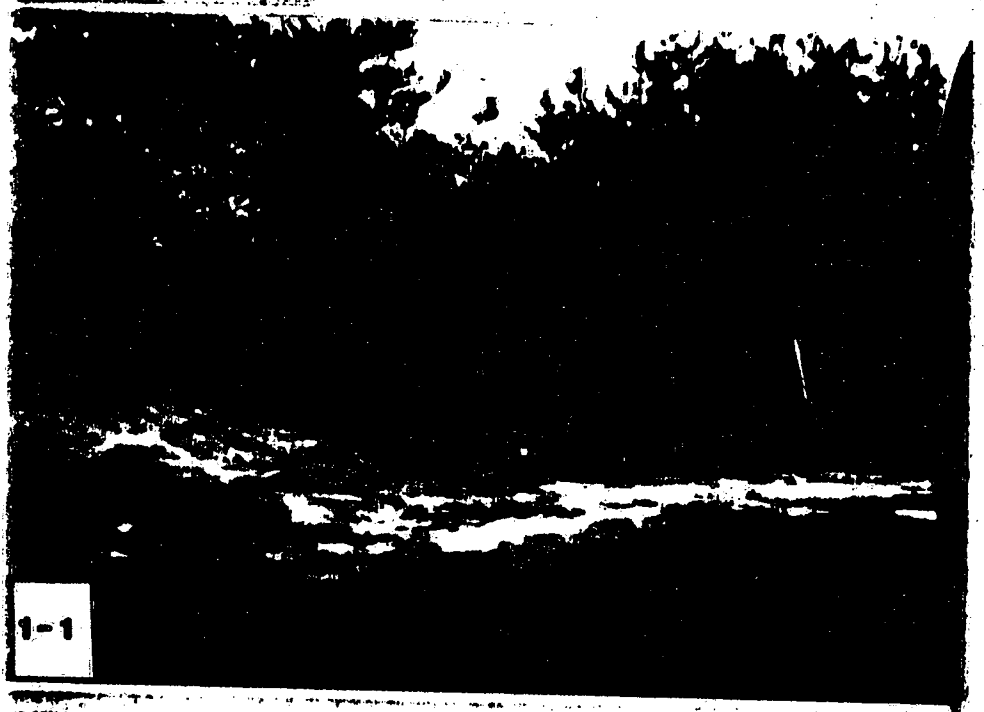
RIVERHEAD & QUOGUE QUADS.

Scale 1:24,000



NOTE: Site situated approximately 0.3 miles southwest of Route 104.
Slope of drum sites and surrounding area is flat.

Figure 1-2. Site sketch. Oakville Drum Site No. 1 , 21 January 1986. (Not to scale)



1-1

1-2

1-3

1-4

1-5

1-6

1-7

1-8

PHOTO LOG - OAKVILLE DRUM SITE NO. 1

Photo	Description
1-1	The dump site is located along a dirt access road. This frame shows the edge of the site (southern drum cluster) adjacent to the road facing southeast.
1-2	Another view of the southern drum cluster facing northwest.
1-3	This is a close-up of several of the drums. They can be seen leaking an asphaltic material.
1-4	Another view of the abandoned drums.
1-5	A PVC well casing located at the junction of the access road (which leads to the site) and Route 104.
1-6	A close-up of a drum containing a white powder.
1-7	A second cluster of drums located approximately 600 ft north of the cluster pictured in Photo 1-4.
1-8	This frame shows the access road and the dense stand of pine which covers the entire area. The photo was taken facing northwest.

2. PURPOSE

The Oakville Drum Site No. 1 was listed on the New York State Registry of Inactive Hazardous Waste Sites because drums of an unknown substance were illegally abandoned at this site.

The goal of the Phase I investigation of this site was to: (1) obtain available records on the site history from state, federal, county, and local agencies; (2) obtain information on site topography, geology, local surface water and ground-water use, previous contamination assessments, and local demographics; (3) interview site owners, operators, and other groups or individuals knowledgeable of site operations; (4) conduct a site inspection to observe current conditions; and (5) prepare a Phase I report. The Phase I report includes a preliminary Hazard Ranking Score (HRS), an assessment of the available information, and a recommended work plan for Phase II studies.

3. SCOPE OF WORK

The Phase I investigation of the Oakville Drum Site No. 1 involved a site inspection by EA Science and Technology, as well as record searches and interviews. The following agencies or individuals were contacted:

Contact	Information Received
Mr. Walter J. Fried, President WJF Realty Corporation P.O. Box 1112 Lily Pond Lane East Hampton, New York 11937	Ownership information
Mr. Bobby Schwartz New York State Department of Transportation Hauppauge, New York (516) 727-1731	Phone interview
Mr. Darrell Kost New York State Department of Transportation Hauppauge, New York (516) 360-6219	Phone interview
Mr. Stan Honor New York State Department of Transportation Hauppauge, New York (516) 360-6044	Phone interview
Mr. Dick Lutzen Henderson Brothers Construction Valley Stream, New York (516) 472-8021	Phone interview
Mr. Mazzilli Environmental Engineering Department Long Island Lighting Company 1660 Walt Whitman Road Melville, New York 11747 (516) 420-6144	No file/information

Contact	Information Received
Mr. Frank Diamiante Real Property Tax Service Agency Suffolk County Center Riverhead, New York 11901 (516) 548-3150	Ownership of site
Mr. Anthony Candela, P.E. Senior Sanitary Engineer New York State Department of Environmental Conservation Division of Solid Waste SUNY Campus - Building 40 Stony Brook, New York 11794 (516) 751-7900	Site file
Ms. Margaret O'Brien Junior Engineering Geologist New York State Department of Environmental Conservation Region I Stony Brook, New York 11790 (516) 751-7900	Site interview
Mr. James Pim, P.E. Suffolk County Department of Health 15 Horseblock Road Farmingville, New York 11738 (516) 548-3330	No file/information
Mr. Steve Carey/Mr. Dennis Moran Suffolk County Department of Health Services Bureau of Water Resources 225 Rabro Drive East Hauppage, New York 11788 (516) 348-2893	Ground-water use; public water supplies and ground-water monitoring information
Mr. Dan Fricke Suffolk County Cooperative Extension 264 Griffing Avenue Riverhead, New York 11901 (516) 727-7850	Ground-water and surface water use for irrigation
Mr. Willian Schickler/Mr. Robert Bowen Suffolk County Water Authortity Sunrise Highway and Pond Road Oakdale, New York 11769 (516) 589-5200	Public water supply and distribution

Contact	Information Received
Mr. Doug Pica New York State Department of Environmental Conservation Division of Water SUNY Campus - Building 40 Stony Brook, New York 11794 (516) 751-7900	Ground-water use for irrigation
Mr. Allan S. Connell District Conservationist U.S. Department of Agriculture Soil Conservation Survey 127 East Main Street Riverhead, New York 11901	Ground-water use for irrigation
Mr. Ken Jones Chief Fire Marshal Town of Southampton 116 Hampton Road Southampton, New York 11968 (516) 283-6020	Information regarding the threat of fire and/or explosion at the site
Mr. Kevin Walter, P.E. New York State Department of Environmental Conservation Division of Hazardous Waste Enforcement 50 Wolf Road Albany, New York 12233-0001 (518) 457-4346	No file/information
Mr. John Iannotti, P.E. New York State Department of Environmental Conservation Bureau of Eastern Remedial Action 50 Wolf Road Albany, New York 12233-0001 (518) 457-5637	No file/information
Mr. Earl Barcomb, P.E. New York State Department of Environmental Conservation Landfill Operations Vatrano Road Albany, New York 12205 (518) 457-2051	No file/information

Contact	Information Received
Mr. Peter Skinner, P.E. New York State Attorney General's Office Room 221 Justice Building Albany, New York 12224 (518) 474-2432	No file/information
Mr. Ron Tramontano/Mr. Charlie Hudson New York State Department of Health Bureau of Toxic Substance Assessment Nelson A. Rockefeller Empire State Plaza Corning Tower Building, Room 342 Albany, New York 12237 (518) 473-8427	No file/information
Mr. James Covey, P.E. New York State Department of Health Nelson A. Rockefeller Empire State Plaza Corning Tower Building Albany, New York 12237 (518) 473-4637	Community Water Supply Atlas
Mr. Rocky Paggione, Atty./ Mr. Louis A. Evans, Atty. New York State Department of Environmental Conservation Division of Environmental Envorcement 202 Mamaroneck Avenue White Plains, New York 10601-5381 (914) 761-6660	No file/information
Mr. Marsden Chen, P.E. New York State Department of Environmental Conservation Bureau of Site Control 50 Wolf Road Albany, New York 12233-0001 (518) 457-0639	Site file
Mr. John W. Ozard Senior Wildlife Biologist New York State Department of Environmental Conservation Wildlife Resources Center SIgnificant Habitat Unit Delmar, New York 12504 (518) 439-7486	Significant habitats

Contact	Information Received
Mr. Perry Katz U.S. Environmental Protection Agency Region II Room 757 26 Federal Plaza New York, New York 10278 (212) 264-4595	No file/information

4. SITE ASSESSMENT - OAKVILLE DRUM SITE NO. 1

4.1 SITE HISTORY

The Oakville Drum Site No. 1 is located about 3,300 ft southeast of the intersection of Riverhead Road and Route 104 in the Town of Southampton, Suffolk County, New York. One hundred and fourteen drums of a white, powder material and an asphalt-like material have been abandoned along a dirt road in a pine barren just off Pleasure Drive (EA Site Inspection). Record searches by the Suffolk County Real Property Tax Service Agency and by Long Island Lighting Company (LILCO) failed to establish the ownership of this site (Appendixes 1.1-1 and 1.1-1a). The New York State Department of Environmental Conservation (NYSDEC) has been aware of the existence of these abandoned drums since 1983, however, they have not identified the origin or the contents of the drums (Appendix 1.1-2, and file searches, Chapter 3). In an attempt to determine both the origin and the content of the drums at this site, EA discussed the site with the Fire Marshal for the Town of Southampton, who indicated that the drums might have been abandoned by the New York State Department of Transportation (NYSDOT) (Appendix 1.1-3). The NYSDOT first indicated that they had no knowledge of the drums, but that they had a storage yard about 1 mi from the site, and that they would go look at some of the abandoned drums to see if they contained the same kind of materials that were being stored at the yard (Appendix 1.1-4). NYSDOT visited the Oakville Drum Site No. 1, and reported that the drums were not from NYSDOT yards, but that they did contain "Stayright" powder (a curing compound for cement material) and an asphalt "crack and joint sealer" (Appendix 1.1-5). NYSDOT further indicated that they had accompanied NYSDEC to the Oakville Drum Site No. 1 in 1983 and had provided the same information at that time. Evidently, in 1983 many of the drums were clearly marked "NYSDPW" (New York State Department of Public Works, which was dissolved in 1968). NYSDOT indicated that this material has evidently been abandoned at both Oakville Drum sites (No. 1 and No. 2) and that it was probably left there by the contractor that built the Sunrise Highway in the early 1970s (Appendix 1.1-6). One of the contractors who worked on that project was contacted but denied knowledge of the drums (Appendixes 1.1-7 and 1.1-8). The site has not been cleaned up to date, the drums containing (apparently) road-construction products are still strewn about the site, and the drums are deteriorating (EA Site Inspection).

4.2 SITE TOPOGRAPHY

The Oakville Drum Site No. 1 is located on eastern Long Island, southeast of Riverhead, at an elevation of approximately 65-75 ft above mean sea level (Appendix 1.2-1). The site environs are essentially flat. Regional slope to the north is about 1 percent northward toward Flanders Bay. Regional slope to the south is about 1 percent southward toward Shinnecock Bay.

The abandoned drums are piled in two clusters along a dirt road, which runs south of the junction of Riverhead Road and Route 104 and intersects the LILCO transmission line corridor. The area is a pine barren. The nearest residence (and private well) is located approximately 3,000 ft west of the site, on Riverhead Road. The nearest commercial building is located about 6,500 ft north of the site along Route 104. The nearest downslope surface water is located about 8,500 ft southeast of the site (an unnamed tributary to Quantuck Creek) (Appendix 1.2-1 and EA Site Inspection).

4.3 SITE HYDROGEOLOGY

The site is directly underlain by Pleistocene Age glacial deposits. This deposit is then in turn underlain by Cretaceous Age Magothy Formation, the Clay Member and Lloyd Sand Member of the Raritan Formation, and finally by Precambrian Age gneiss and schist bedrock (Appendixes 1.3-1 and 1.3-2). The ground surface elevation at the site averages approximately 65-75 ft above MSL. The Pleistocene deposits are estimated to be 100 ft in thickness (Appendix 1.3-3) and largely comprised of sand and gravel.

Water pumped from aquifers underlying Suffolk County is the sole source of water for public supply, agriculture, and industry (Appendix 1.3-4). The glacial and Magothy aquifers act as a single hydrologic unit (Appendix 1.3-4). Apparently only the glacial aquifer portion has been developed for water supply within 3 mi of the site, however, both the glacial and Magothy aquifers are designated as the aquifer of concern.

Recharge to the upper glacial aquifer is derived entirely from precipitation. The average annual precipitation in the area is 45 in. of which approximately 22 in. is estimated to infiltrate to the water table (Appendix 1.3-5). The remainder of the precipitation is returned to the atmosphere by evaporation and transpiration, except for a small amount of runoff to stream. Recharge to the Magothy aquifer is derived entirely from the downward movement of water from the overlying glacial aquifer.

Site specific permeability data are not available. However infiltration tests performed in the upper Pleistocene glacial deposits in the vicinity of the Brookhaven National Laboratory (Warren et al. 1968) indicate that water may move from the land surface to the water table at rates of up to 30 ft/day (Appendix 1.3-5). Warren et al. (1968) also reports an average porosity value of 0.33 and vertical permeabilities ranging from 75 to 350 gpd/ft^2 for the saturated portion of the upper Pleistocene glacial deposits (upper glacial aquifer).

Based upon the March 1985 ground-water table contour map (Suffolk County Department of Health Services), the depth to ground water is estimated to be approximately 45-55 ft below ground surface, and the regional ground-water natural (unaffected by pumping) flow direction appears to be toward the northeast. Within 3 mi of the site, the aquifer of concern has been reportedly developed by one Suffolk County Water Authority well field, a well at the East Quogue Mobile Home Estates, and numerous private wells. Appendix 1.3-6 provides a list of the municipal and community wells located within 3 mi of the site. The developed area within 3 mi of the site is served by the Suffolk County Water Authority, the East Quogue Mobil Home Estates, and numerous private wells.

4.4 SITE CONTAMINATION

Waste Types and Quantities

One hundred and fourteen drums of an asphalt-like chemical and a white, powdered chemical have been abandoned at the site. The asphalt material is evidently "crack and joint sealer," and the powdered chemical is evidently "Stayright," a curing compound for cement. The materials might have been used to build the Sunrise Highway in the early 1970s and abandoned when that project was completed, although this has not been definitively established. The materials have not been chemically analyzed (Appendixes 1.1.2 through 1.1-8).

Ground Water

No data available.

Surface Water

No data available.

Soil

No data available.

Air

An HNU was used to measure volatile organics during EA's site inspection on 21 January 1986; no readings above background were observed.

OAKVILLE DRUM SITE NO. 1
TOWN OF SOUTHAMPTON, SUFFOLK COUNTY

The Oakville Drum Site No. 1 is located approximately 3,300 ft southeast of the intersection of Riverhead Road and Route 104 in the Town of Southampton, Suffolk County, New York. One hundred and fourteen drums of a white, powder material and an asphalt-like material have been abandoned along a dirt access road in a pine barren. Record searches by the Suffolk County Real Property Tax Service Agency and by the Long Island Lighting Company (LILCO) failed to establish the ownership of the site. The New York State Department of Environmental Conservation (NYSDEC) has been aware of the existence of these drums since about 1983, however, they have not identified the origin or the contents of the drums. The New York State Department of Transportation (NYDSDOT) has visited the Oakville Drum Site No. 1, and indicates that the powder waste is "Stayright" (a curing compound for cement) and the asphalt-type waste is ordinary "crack and joint sealer" that is used on roads. NYSDOT believes that these abandoned drums were left behind by the contractor who built the Sunrise Highway in the early 1970s.

Coordinates:
Longitude: 40° 52' 47.4"
Latitude: 72° 37' 49"

OAKVILLE DRUM SITE No. 1

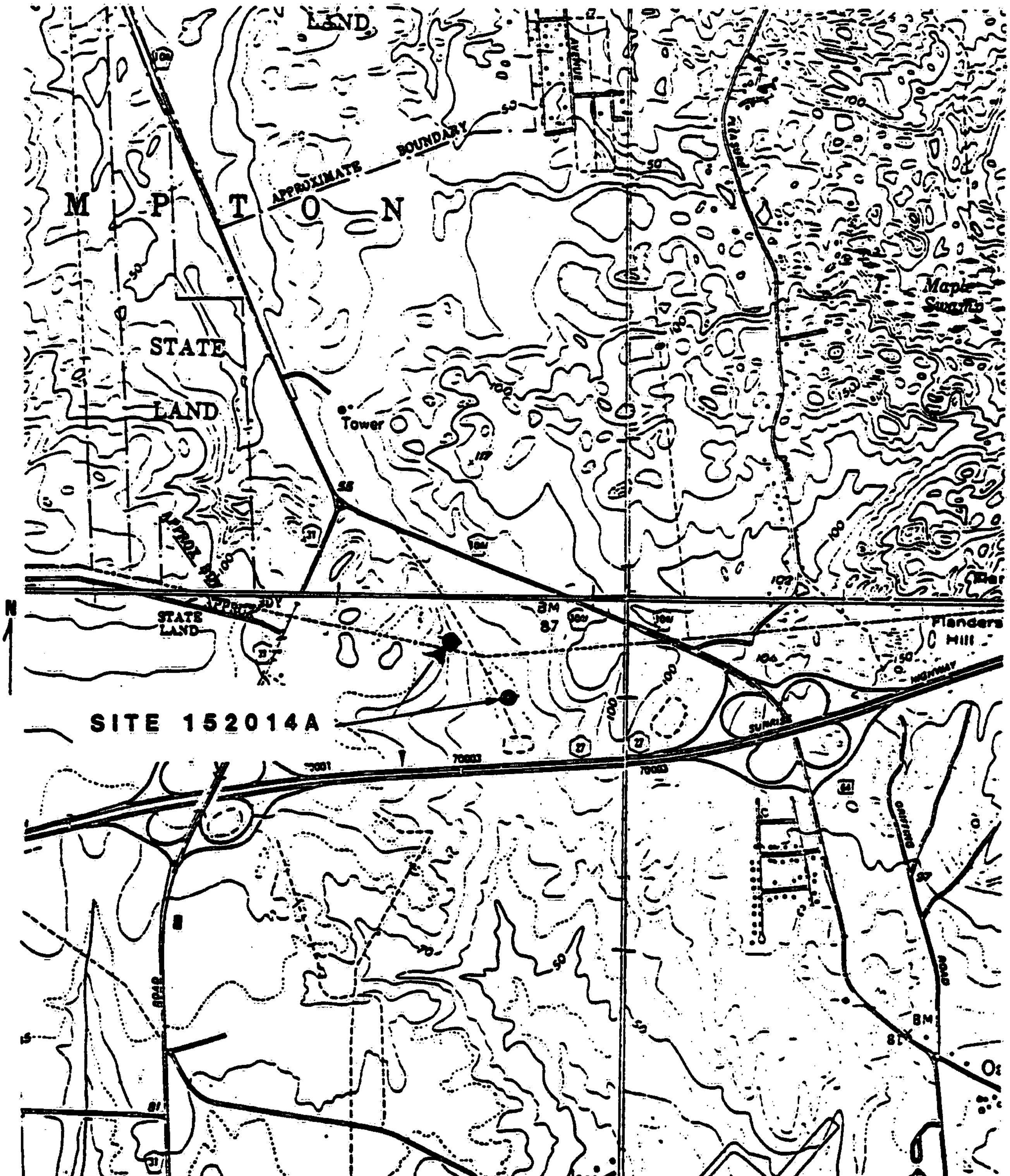


Figure 1-1.

EASTPORT, MATTITUCK, RIVERHEAD & QUOGUE QUADS.

Scale 1:24,000

REFERENCES

1. U.S. Environmental Protection Agency. 1984. Uncontrolled Hazardous Waste Site Ranking System. A Users Manual. (HW-10). Originally published in the July 16, 1982, Federal Register.

2. Jensen, H.M. and J. Soren. 1971. Hydrogeologic Data From Selected Wells and Test Holes in Suffolk County, Long Island, New York. Long Island Water Resources Bulletin No. 3. Suffolk County Department of Environmental Control. (Appendix 1.3-1.)

3. DeLaguna, W. 1963. Geology of Brookhaven National Laboratory and Vicinity, Suffolk County, New York. Geological Survey Bulletin 1156-A. (Appendix 1.3-2.)

4. Suffolk County Department of Health Services (SCDHS). Contour Map of the Water Table and Location of Observation Wells in Suffolk County, New York.

5. New York State Department of Transportation (NYSDOT). 1981. 7.5-Minute Topographic Series. Eastport, Quogue, Riverhead, and Mattituck Quads. (Appendix 1.2-1.)

6. Heil, J. 1983. NYSDEC Memorandum to H. Berger. 19 August (Appendix 1.1-2.)

7. EA Site Inspection, 21 January 1986.

8. Warren, M.A., W. DeLaguna, and N.J. Lusczynski. 1968. Hydrology of Brookhaven National Laboratory and Vicinity, Suffolk County, New York. Geological Survey Bulletin 1156-C. (Appendix 1.3-5.)

9. Dan Raviv Associates, Inc. 1984. Phase I Evaluation Geohydrologic/Water Quality Conditions Suffolk County Airport and Vicinity, Westhampton, New York. Prepared for Environmental Protection Bureau, New York State Department of Law. Revised. (Appendix 1.3-3.)

10. Swartz, B. 1986. Highway Supervisor, NYSDOT. Personal communication. 30 October. (Appendix 1.1-5.)

11. Kost, D. 1986. Environmental Affairs, NYSDOT. Personal communication. 30 October. (Appendix 1.1-6.)

12. SCDHS. Supply and Monitoring Well Location Maps. Water Resources Division. (Appendix 1.3-6.)

13. New York State Department of Health (NYSDOH). 1982. New York State Atlas of Community Water Systems Sources. (Appendix 1.5-1.)

14. Suffolk County Water Authority (SCWA). 1985. Distribution of System Plates: 16H and 17H. (Appendix 1.3-6.)

REFERENCES (Cont.)

15. NYSDOH. 1984. Inventory - Community Water Systems. New York State. (Appendix 1.5-2.)

16. SCWA. 1985. Active Service Estimates. (Appendix 1.5-3.)

17. Long Island Regional Planning Board (LIRPB). 1982. Land Use in 1981. Quantification and Analysis of Land Use for Nassau and Suffolk Counties. Plates 12 and 13. Hauppauge, Long Island, New York. (Appendix 1.5-4.)

18. Connell, A. 1986. District Conservationist, USDA Soil Conservation Service. Personal communication. 13 March. (Appendix 1.5-5.)

19. Fricke, D. 1986. Suffolk County Cooperative Extension Association. Personal communication. 7 April. (Appendix 1.5-6.)

20. Carey, S. 1986. Ground Water Section, SCDHS. Personal communication. 7 April. (Appendix 1.5-7.)

21. Pica, D. 1986. Water Unit, Region I, New York State Department of Environmental Conservation (NYSDEC). Personal communication. (Appendix 1.5-8.)

22. Guthrie, C. 1986. Regional Fisheries Manager, NYSDEC, Region I. Personal communication. 15 August. (Appendix 1.5-9.)

23. Ozard, J.W. 1986. Senior Wildlife Biologist, NYSDEC Wildlife Resources Center, Significant Habitat Unit. Personal communication. 6 March. (Appendix 1.5-10.)

24. Jones, K. 1986. Chief Fire Marshal, Town of Southampton. Personal communication. 29 October. (Appendix 1.1-3.)

25. LIRPB. 1985. Population Survey. Current Population Estimates for Nassau and Suffolk Counties. Hauppauge, Long Island, New York.

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington, DC 20460

EPA Form 2070-12
July, 1981

Oakville Drum Site No. 1

EPA

Potential Hazardous Waste Site

Preliminary Assessment

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site) Oakville Drum Site - LILCO	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER Access Road off County Route 113				
03 CITY Oakville	04 STATE NY	05 ZIP CODE	06 COUNTY Suffolk	07 COUNTY CODE 103	08 CONG DIST 1
09 COORDINATES LATITUDE 40° 52' 47" 4	LONGITUDE 72° 37' 49"0				

10 DIRECTIONS TO SITE (Starting from nearest public road)

South from Riverhead on Riverhead-Quogue Road. Left on County Route 113. Access Route on right. Travel .2 miles.

III. RESPONSIBLE PARTIES

01 OWNER (If known) Unknown	02 STREET (Business, mailing, residential)		
03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER ( )
07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)		
09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER ( )

13 TYPE OF OWNERSHIP (Check one)

☐ A. PRIVATE ☐ B. FEDERAL: ____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL

☐ F. OTHER: ____ (Specify) ☒ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☐ A. RCRA 3001 DATE RECEIVED: __/__/__ MONTH DAY YEAR ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__ MONTH DAY YEAR ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES DATE 1 /21 86 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply) ☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR ☒ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: ____ (Specify)

CONTRACTOR NAME(S): ____

02 SITE STATUS (Check one) ☐ A. ACTIVE ☒ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION ____ BEGINNING YEAR | ____ ENDING YEAR ☒ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Drums of asphaltic material and powdered chemical.in several different clusters.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Ground-water contamination.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT Rebecca Ligotino	02 OF (Agency/Organization) EA Science and Technology		03 TELEPHONE NUMBER (914) 692-6706
04 PERSON RESPONSIBLE FOR ASSESSMENT Lawrence Wilson	05 AGENCY same	06 ORGANIZATION	07 TELEPHONE NUMBER ( )
			08 DATE 3 /10 /86 MONTH DAY YEAR

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D981186893

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☐ A. SOLID
- ☒ B. POWDER, FINES
- ☐ C. SLUDGE
- ☐ D. OTHER ______ (Specify)
- ☐ E. SLURRY
- ☒ F. LIQUID
- ☐ G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS ______

CUBIC YARDS ______

NO. OF DRUMS 113

03 WASTE CHARACTERISTICS (Check all that apply)

- ☒ A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☐ D. PERSISTENT
- ☐ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☐ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS	113*	55 gallon	
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers) Unknown

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION

V. FEEDSTOCKS (See Appendix for CAS Numbers) Not applicable

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EA site inspection, 21 January 1986

*NYSDOH Bureau of Toxic Substances file.

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington, DC 20460

EPA Form 2070-13
July, 1981

Oakville Drum Site No. 1

EPA

Potential Hazardous Waste Site

Site Inspection Report

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D981186893

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Oakville Drum Site No. 1	Dirt road off Route 104

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Southampton (Town)	NY		Suffolk		

09 COORDINATES: LATITUDE 40° 52' 47.4" LONGITUDE 72° 37' 49"

10 TYPE OF OWNERSHIP (Check one): ☐ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☒ F. OTHER ☒ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
1 , 21, 86 (MONTH DAY YEAR)	☐ ACTIVE ☒ INACTIVE	BEGINNING YEAR / ENDING YEAR — X UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR (Name of firm)
☐ E. STATE ☒ F. STATE CONTRACTOR EA Science and Tech (Name of firm) ☐ G. OTHER (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Larry Wilson	Environmental Scientist	EA	(914 692-6706

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Andris Lapins	Geologist	EA	(914 692-6706
M. O'Brien		NYSDEC	(516) 751-7900
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☐ PERMISSION ☒ WARRANT	1330	Clear, 14 C, windy

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO
R. Ligotino	EA Science and Technology	(914) 692-6706

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
L. Wilson		EA	(914) 692-6706	1 31 86 (MONTH DAY YEAR)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D981186893

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☐ A. SOLID
- ☐ B. POWDER, FINES
- ☒ C. SLUDGE
- ☐ D. OTHER ________ (Specify)
- ☐ E. SLURRY
- ☐ F. LIQUID
- ☐ G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

- TONS ________
- CUBIC YARDS ________
- NO. OF DRUMS 114

03 WASTE CHARACTERISTICS (Check all that apply)

- ☐ A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☐ D. PERSISTENT
- ☐ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☐ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☒ M. NOT APPLICABLE

III. WASTE TYPE Road construction and maintainance products

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers) Not applicable

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION

V. FEEDSTOCKS (See Appendix for CAS Numbers) N/A

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EA Site Inspection
Appendixes 1.1-2, 1.1-5, and 1.1-6.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. HAZARDOUS CONDITIONS AND INCIDENTS None

01 ☒ A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 19,099
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Ground water in aquifer of concern is source for one Suffolk County Water Authority well field, a mobile home park, and an undetermined number of private residences.

01 ☐ B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: ______
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential. Intervening terrain to nearest downslope surface water 1.6 mi away has a slope of <1 percent.

01 ☐ C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: ______
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No data available.

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: ______
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No imminent threat of fire or explosion.

01 ☒ E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: 576
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Drums have been abandoned in an area having unrestricted access.

01 ☒ F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: ______ (Acres)
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Abandoned drums containing a curing compound for cement material and an asphalt crack and joint sealer are rusting and some have leaked.

01 ☒ G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 19,099
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Limited to population served by groundwater from the aquifer of concern within a 3 mi radius of the site.

01 ☐ H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: ______
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported.

01 ☐ I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: ______
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None known.

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (include name(s) of species)

None known.

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None known.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 19,099 — 04 NARRATIVE DESCRIPTION

Drums of potentially hazardous substances are rusting and some have leaked.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential.

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☒ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Drums (114 55-gal) containing a curing compound for cement material and an asphalt crack and joint sealer have been abandoned. Drums are rusting and some have leaked.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

None known.

III. TOTAL POPULATION POTENTIALLY AFFECTED: 19,099

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

References: 6, 7, 10-16, 24, and 25.

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION

PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☒ J. NONE				material dump illegally

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☒ C. DRUMS, ABOVE GROUND	114	55-gal
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☐ F. LANDFILL		
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

☐ A. INCENERATION
☐ B. UNDERGROUND INJECTION
☐ C. CHEMICAL/PHYSICAL
☐ D. BIOLOGICAL
☐ E. WASTE OIL PROCESSING
☐ F. SOLVENT RECOVERY
☐ G. OTHER RECYCLING/RECOVERY
☐ H. OTHER ________ (Specify)

05 OTHER

☐ A. BUILDINGS ON SITE

06 AREA OF SITE

0.5 (Acres)

07 COMMENTS

Drums have been abandoned along a dirt road in a pine barren. Drums contain "Stay-right" powder, a curing compound for cement material and an asphalt "crack and joint sealer."

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☒ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

Drums are rusting and some have leaks.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☒ YES ☐ NO

02 COMMENTS

Access is unrestricted.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

EA Site Inspection, 22 January 1986.
Chapter 3.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☒
NON-COMMUNITY	C. ☐	D. ☒

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☒
D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE

A. 2.3 (mi)
B. 0.45 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☒ A. ONLY SOURCE FOR DRINKING ☐ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 19,099

03 DISTANCE TO NEAREST DRINKING WATER WELL 0.45 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
45-55 (ft)	NE	45-55 (ft)	unknown (gpd)	☒ YES ☐ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

There are two SCWA wells located within 3 mi of the site along Spinney Road. No. 1S-23184 is 118 ft deep and 2S-5393 is 161 ft deep, both drawing from the upper glacial aquifer. They serve the Westhampton Beach Water District.

10 RECHARGE AREA
☒ YES
☐ NO
COMMENTS

11 DISCHARGE AREA
☐ YES
☒ NO
COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☒ A. RESERVOIR, RECREATION DRINKING WATER SOURCE ☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Unnamed tributary to Quantuck Creek	☐	1.6 (mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 576 NO. OF PERSONS	B. 2,551 NO. OF PERSONS	C. 5,105 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 0.45 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE

04 DISTANCE TO NEAREST OFF-SITE BUILDING 0.45 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Site is located in a wooded area. Much of the area is unpopulated.

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE: NY
02 SITE NUMBER: D981186893

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)
☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☐ C. $10^{-4} - 10^{-3}$ cm/sec ☒ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one) Unknown
☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK: 1400-1500 (ft)
04 DEPTH OF CONTAMINATED SOIL ZONE: unknown (ft)
05 SOIL pH: unknown

06 NET PRECIPITATION: 22 (in)
07 ONE YEAR 24 HOUR RAINFALL: 2.5-3.0 (in)
08 SLOPE — SITE SLOPE: 0 % — DIRECTION OF SITE SLOPE: N/A — TERRAIN AVERAGE SLOPE: 1 %

09 FLOOD POTENTIAL: SITE IS IN N/A YEAR FLOODPLAIN
10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)
ESTUARINE A. >2 (mi) OTHER B. ______ (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species) ______ (mi)
ENDANGERED SPECIES: N/A

13 LAND USE IN VICINITY
DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS PRIME AG LAND	AGRICULTURAL LANDS AG LAND
A. 1.23 (mi)	B. 0.45 (mi)	C. 1.3 (mi)	D. 1.3 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site and surrounding terrain is relatively flat and very thickly wooded.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

USGS. 1956. 7.5-Minute Series. Mattituck, Eastport, Riverhead, and Quogue Quads. Appendix 1.3-6.

Ozard, J. 1986. Senior Wildlife Biologist. NYSDEC. Significant Habitat Unit. Personal Communication. 26 February.

EA Site Inspection, 22 January 1986.

LIRPB. 1985. Population Survey. Current Population Estimates for Nassau and Suffolk Counties. Hauppauge, New York.

USGS. 1967. Map of Flood-Prone Areas. Mattituck and Eastport Quads. 7.5-Mintue Series.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. SAMPLES TAKEN None

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER			
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Volatile organics	HNU; no readings above background.
Slope	Suunto clinometer
Bearing	Compass

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☒ AERIAL

02 IN CUSTODY OF EA Science and Technology (Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS EA Science and Technology

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EA Site Inspection.
Chapter 3.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. CURRENT OWNER(S) Unknown

01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	
01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	
01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	
01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	

PARENT COMPANY (If applicable)

08 NAME			09 D+B NUMBER
10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE
12 CITY	13 STATE	14 ZIP CODE	
08 NAME			09 D+B NUMBER
10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE
12 CITY	13 STATE	14 ZIP CODE	
08 NAME			09 D+B NUMBER
10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE
12 CITY	13 STATE	14 ZIP CODE	
08 NAME			09 D+B NUMBER
10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE
12 CITY	13 STATE	14 ZIP CODE	

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	
01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	
01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	

IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	
01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	
01 NAME			02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Appendix 1.1-1.
Chapter 3.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. CURRENT OPERATOR (Provide if different from owner) N/A

01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER	

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER	
12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
14 CITY	15 STATE	16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD	
01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD	
01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD	

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER	
12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
14 CITY	15 STATE	16 ZIP CODE
10 NAME	11 D+B NUMBER	
12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
14 CITY	15 STATE	16 ZIP CODE
10 NAME	11 D+B NUMBER	
12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
14 CITY	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. ON-SITE GENERATOR N/A

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Appendix 1.1-1 and Chapter 3.

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ W. GAS CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ X. FIRE CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Chapter 3.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. PAST RESPONSE ACTIVITIES None

01 ☐ A. WATER SUPPLY CLOSED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ G. WASTE DISPOSED ELSEWHERE 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ H. ON SITE BURIAL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ I. IN SITU CHEMICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ L. ENCAPSULATION 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D981186893

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☒ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Chapter 3.

6. ASSESSMENT OF DATA ADEQUACY AND RECOMMENDATIONS

6.1 ADEQUACY OF EXISTING DATA

The available data are considered insufficient to prepare a final HRS score for the Oakville Drum Site No. 1. There is no documentation of hazardous waste disposal. However, during EA's site reconnaissance, deteriorating drums of an asphalt-like material were observed. Also, ground-water and sediment quality data are lacking.

6.2 RECOMMENDATIONS

In order to prepare a final HRS score for this site, analytical data regarding the quality of the ground water will be necessary, thus requiring performance of a Phase II investigation. The proposed Phase II study would include the installation of four test borings/observation wells, and the collection and analysis of ground-water and sediment samples.

6.3 PHASE II WORK PLAN

6.3.1 Task 1 - Mobilization and Site Reconnaissance

Project mobilization includes review of the Phase I report and updating the site database with any new information made available since completion of the Phase I report. Based on that review, a draft scope of work for this site will be agreed to and a project schedule developed. At this time, a draft Quality Assurance/Quality Control (QA/QC) document will be prepared in accordance with the most up-to-date NYSDEC guidelines.

Site reconnaissance will be performed to examine general site access for Phase II studies. Site reconnaissance will familiarize key project personnel with the site, enable the project Health and Safety Officer to develop specific health and safety requirements for the field activities. Emergency, fire, and hospital services will be identified. Standard practice during site reconnaissance is an air survey with a photoionization detector (HNU or similar instrument). The air survey would be performed around the site perimeter and throughout the site for safety purposes. Detection of releases to air during site reconnaissance may warrant further confirmation studies. Based on the Phase I study, it is expected that field activities will require only Level D health and safety protective measures.

6.3.2 Task 2 - Geophysics

Multidepth EM and earth resistivity surveying will be performed around the site area perimeter to evaluate the potential presence of ground-water contaminant plumes and stratigraphic conditions. The number of stations and value of depth settings will be determined on the basis of field conditions. Results of the geophysics will be used to refine the specifications for locations, depths, and number of observation wells to be installed.

6.3.3 Task 3 - Preparation of Final Sampling Plan

All data collected during Tasks 1 and 2 will be evaluated to finalize sampling and boring/well locations. The final sampling plan will be developed and submitted to NYSDEC for approval. The plan will include final sampling locations, boring and well specifications, and reference pertinent portions of the QA/QC Plan. A final budget will be developed to complete the drilling and sampling program.

6.3.4 Task 4 - Test Borings and Observation Wells

Because there are several hundreds of feet of unconsolidated sediment overlying bedrock, EA recommends that the subsurface investigation be confined, at this time, to the shallow glacial aquifer to confirm if ground-water contamination is present. If ground-water contamination is detected, then the investigations could be expanded to include the installation and sampling of monitoring wells completed to greater depths. Based upon currently available information, EA recommends the installation of four test borings/observation wells. This work would be performed under the fulltime supervision of a geologist. It is anticipated that the hollow-stem auger or rotary-wash drilling method will be used. Prior to the drilling of each boring/well, and at the completion of the last boring/well, the drilling equipment which comes in contact with subsurface materials will be steam-cleaned, as well as the split-spoon sampler after obtaining each sample. Soil sampling will be performed using a split-spoon sampler at approximately 5-ft intervals and at detected major stratigraphic changes. An HNU, or similar instrument, would be used to monitor the potential organic vapors emitted during drilling operations and from each soil sample. Samples of major soil/unconsolidated sediment will be collected for grain-size and/or Atterburg Limits analysis.

It is anticipated that the wells to be installed at this site will be completed in the unconsolidated sediment, approximately 20 ft below the ground-water table. Standard construction of such a well would include approximately 20 ft of 2-in. diameter threaded-joint PVC screen and an appropriate length of PVC riser with a bottom plug cap, sand pack, bentonite seal, and protective surficial steel casing with a locking cap.

Upon completion and development of the wells by air surging/pumping, the vertical elevation of the upper rim of each well casing and the horizontal location will be surveyed in order to aid in evaluation of the ground-water flow direction. Depending upon the yield of each Phase II well, a short-term, low-yield pumping test will be performed in each well.

For cost estimating purposes, it is assumed that:

a. The depth of each of the two wells at the northern cluster of drums will be 75 ft below grade. The depth of each of the two monitoring wells to be located at the southern cluster of drums will be 65 ft below grade.

b. The four wells will require 14 days to install, develop, and test.

c. All drill sites are accessible by truck-mounted drilling rigs as determined by the driller.

d. There are no excessive amounts of cobbles/boulders which would increase drilling time.

e. Steam-cleaning of drilling/sampling equipment will be performed at each boring/well location. The fluids will be discharged to ground surface.

f. All drill cuttings, fluids, and development water will be left on, or discharged to, the ground surface in the immediate area of the activity.

g. That permission from appropriate land owners to drill borings/wells on their property will be a simple process (expedited by the NYSDEC, if necessary) so that delays during field operations are not incurred.

6.3.5 Task 5 - Sampling

All sampling and analysis will be conducted in accordance with the project QA/QC Plan. The analytical program for every water sample will include the 130 organic and 25 inorganic parameters listed in Statement of Work No. 784, New York State Department of Environmental Conservation Superfund and Contract Laboratory Protocol, January 1985. Also, all additional non-priority pollutant GC/MS major peaks will be identified and quantified. Major peaks will be considered as those whose area is 10 percent or greater than the calibrating standard(s). Based upon the currently available information, collection and analysis of the following numbers and types of samples is recommended:

4 Ground-water samples (one from each Phase II well).

2 Surficial sediment samples (one composite each from each of the two clusters of drums, to be collected from four to six locations and approximately 0.5-1.5 ft below grade at each of the two clusters of drums.

2 Drum samples (one grab-type sample each of the asphalt-like material and the powder). The analytical parameters will be the same as for the water and sediment samples, plus EP Toxicity.

6.3.6 Task 6 - Contamination Assessment

EA will evaluate the data obtained during the records search and field investigation: prepare final HRS scores and documentation forms; complete EPA Form 2070-13; summarize site history, site characteristics, available sampling and analysis data; and determine the adequacy of the existing data to confirm release, and if there is a population at risk.

6.3.7 Task 7 - Remedial Cost Estimate

EA will evaluate remedial alternatives for the site and develop a list of potential options given the information available on the nature and extent of contamination. Approximate cost estimates for the selected potential remedial options will be computed. This work is not intended to be, or a substitute for, a formal cost effectiveness analysis of potential remedial actions.

6.3.8 Task 8 - Final Phase II Report

In accordance with current (January 1985) NYSDEC guidelines, the Phase II report will include:

a. The results of the Phase II investigation, complete with boring logs, photos, and sketches developed as part of the Phase II field work.
b. Final HRS scores with detailed documentation.
c. Selected potential remedial alternatives and associated cost estimates.

In addition to the final Phase II report, the following raw data and resulting reduction would be provided to NYSDEC:

a. geophysical
b. well logs
c. all sampling forms and data
d. all analytical data
e. chain-of-custody forms
f. other pertinent collected information.

6.3.9 Task 9 - Project Management/Quality Assurance

A Project Manager will be responsible for the supervision, direction, and review of the project activities on a day-to-day basis. A Quality Assurance Officer will ensure that the QA/QC Program protocols are maintained and that the resultant analytical data are accurate.

6.4 PHASE II COST ESTIMATE

Based on the scope of work and assumptions described above, the estimated costs to complete the Phase II investigation of the Oakville Drum Site No. 1 are as follows:

Consultant Costs (including labor, direct costs, fee)	$38,120
Drilling Contractor	37,375
Laboratory	15,600
Total	$91,095

Appendix 1.1-1

p 1 of 2

EA SCIENCE AND TECHNOLOGY

A Division of EA Engineering, Science, and Technology, Inc.

COMMUNICATIONS RECORD FORM

Distribution: ( ) Oakville Farm (AB) (WJF) (L LCO)
( ) ________, ( ) ________
( ) Author

Person Contacted: Mrs. Mooney / Frank Diamicante Date: 3-17-86

Phone Number: (516) 548-3161 Title: ~~[illegible]~~ Real Property Tax Service Ag

Affiliation: Suffolk County Type of Contact: Phone

Address: Suffolk Co. Center
Riverhead NY
Person Making Contact: L Wilson

Communications Summary: [illegible] could not identify owners based upon map provided
I gave the coordinates of both sites. They will call back.

3/? call: Coordinates were of no use on the tax maps. Unable to suggest any means of positively identifying the property owners.

(see over for additional space)

Signature: Larry Wilson

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

p 242.

COMMUNICATIONS RECORD FORM

Distribution: ( ) Calverton Cum Site (450) 152014A
( ) ______ , ( ) ______
( ) Author

Person Contacted: Mr. Mazzilli Date: 1-17-86

Phone Number: (516) 43?-?144 Title: Environmental Engineer

Affiliation: LILCO Environmental Engineering Type of Contact: Phone

Address: 1660 Walt Whitman Rd Person Making Contact: L. Wilson
Melville, N.Y.

Communications Summary: Mazzilli had no knowledge of the site. The land it is located on is not owned by LILCO, they only have right of way. He did not know the owner of the site. Offered to meet us for a site inspection.

(see over for additional space)

Signature: Larry Wilson

RAC
Should resp[illegible] once the answer report comes in

INC WJF REALTY CORPORATION
LILY POND LANE
EASTHAMPTON, N.Y. 11937
P.O. BOX 1112

REAL ESTATE
INVESTMENTS

REAL ESTATE
CONSULTANTS

Check with these people as to their possible ownership of these sites. Perhaps a copy of the topo map would clear

RECEIVED
DEC 1[illegible] 1984
BUREAU OF [illegible] CONTROL
DIVISION OF [illegible]
HAZ-[illegible]

December 10, 1984

Mr. Charles N. Goddard, P.E.
Chief
Bureau of Hazardous Site Control
Division of Solid and Hazardous Waste
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233-0001

Dear Sir:

We are in receipt of a letter from you, copy of which is enclosed, which states that we should communicate with Mr. Robert Olazagasti for further information but fails to give his address.

We also enclose a notice received just about a year ago and copy of our reply. Please again note the correct address of this corporation.

This corporation is a part owner of approximately 450 acres of land east of County Road 31 (also known as Old Riverhead Road) and both north and south of the Sunrise Highway. However, none of this property is owned in common with Lilco and neither this corporation nor any of the co-owners of its property is involved in any activity whatever except holding title to the vacant land.

If anyone is dumping hazardous or any other waste on our property we know nothing about it and should like to be informed as to the portion of our property on which this is taking place and who is responsible if you are able to tell us.

I hope it will not take another year before we hear further.

Very truly yours,

Walter J. Fried
Pres.

WJF:hs
Enclosure

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

COMMUNICATIONS RECORD FORM

Distribution: ( ) ____________, ( ) ____________

( ) ____________, ( ) ____________

( ) Author

Person Contacted: Walter J. Fried Date: 8 September 198

Phone Number: (212) 820-8160 Title: President

Affiliation: WJF Realty Corporation Type of Contact: Telephone

Address: Lily Pond Lane Person Making Contact: ____________

Easthampton, NY 11937

P.O. Box 1112

Communications Summary: Mr. Fried said that the property owned by WJF Corp north of Sunrise Highway, was sold last year to Flanders Associates c/o Highland Enterprises 107 Northern Blvd Great Neck, New York (516) 829-3960

(see over for additional space)

Signature: Ellen B. Metzger

RECEIVED SEP 21 1987

FRIED, FRANK, HARRIS, SHRIVER & JACOBSON

ONE NEW YORK PLAZA · NEW YORK, N.Y. 10004-1980

(212) 820-8000
CABLE "STERIC NEW YORK"
TELEX
W. U. I. 662119
W. U. I. 620223
W. U. DOM 128173
FACSIMILE:
XEROX (212) 747-1526
RAPICOM (212) 820-6446
DEX (212) 269-2644
DEX (212) 747-1526

WRITER'S DIRECT LINE

(212) 820-8160

September 16, 1987

Ms. Ellen B. Metzger
Geologist
EA Science and Technology
R.D. 2, Box 91
Goshen Turnpike
Middletown, New York 10940

Dear Ms. Metzger:

I acknowledge receipt of your letter of September 9 to WJF Realty Corporation together with enclosed maps.

Site 152014B and the more easterly of Site 152014A are definitely not within the boundaries of the premises conveyed by WJF Realty and Reed Rubin to Flanders Associates. I cannot be sure as to the more westerly of the two sites of 152014A; however, I enclose a copy of the metes and bounds description from the deed which may enable you to make a determination.

Very truly yours,

Walter J. Fried

Walter J. Fried

WJF:afb
Enclosures

SCHEDULE A

ALL that certain plot, piece or parcel of land, situate, lying and being in the Town of Southampton, County of Suffolk and State of New York, known and designated upon a certain map entitled, "Map of Westhampton Beach Gardens" which map was filed in the Office of the Clerk of the County of Suffolk on April 13, 1936 as Map No. 1201, as and by the following lots and blocks:

Block 27: Lots 1 to 51 both inclusive.
Block 28: Lots 1 to 51 both inclusive
and two described pieces of property which when taken together are more particularly bounded and described as follows:
BEGINNING at a monument set at the intersection of the easterly line of the Westhampton-Riverhead Road with the southerly line of land now or formerly of Scheinberg and;

RUNNING THENCE from said point of beginning easterly and northerly along the land now or formerly of Scheinberg the following courses and distances:
1. South 55 degrees 10 minutes 7 seconds East 600.62 feet to a point;
2. North 34 degrees 47 minutes 50 seconds East 703.22 feet to the southerly line of the Quogue Road;

THENCE South 55 degrees 54 minutes 08 seconds East along the southerly line of the Quogue Road 348.98 feet to the westerly line of the Old Quogue Road;

THENCE Southerly along the westerly line of the Old Quogue Road the following four courses and distances:
1. South 18 degrees 27 minutes 58 seconds East 142.98 feet;
2. South 33 degrees 21 minutes 18 seconds East 172.67 feet;
3. South 16 degrees 48 minutes 08 seconds East 285.12 feet;
4. South [illegible] degrees 08 minutes 18 seconds East 68.98 feet to a point;

THENCE South 9 degrees 10 minutes 30 seconds West 1185.02 feet along the westerly line of a realty subdivision designated and shown on a certain map entitled "Westhampton Beach Gardens" and filed in the Office of the Clerk of Suffolk County on April 15, 1936 as map No. 1201;

THENCE South 80 degrees 49 minutes 30 seconds East 254 feet to the easterly line of the above described map "Westhampton Beach Gardens."

THENCE North 9 degrees 10 minutes 30 seconds East along the easterly line of the Westhampton Beach Gardens Map 743.06 feet to the westerly line of the Old Quogue Road;

THENCE Southerly along the westerly line of the Old Quogue Road the following courses and distances:

1. South 27 degrees 38 minutes 08 seconds East 112.04 feet;
2. South 19 degrees 00 minutes 28 seconds East 204.37 feet;
3. South 13 degrees 41 minutes 48 seconds East 178.50 feet;
4. South 20 degrees 16 minutes 28 seconds East 340.09 feet;
5. South [illegible] degrees 55 minutes 08 seconds East 208.71 feet;
6. South 19 degrees 56 minutes 58 seconds East 377.22 feet;
7. South 13 degrees 25 minutes 58 seconds East 223.85 feet;
8. South [illegible] degrees 17 minutes 48 seconds East 119.01 feet to the northerly line of the land of the New York State Department [illegible] Transportation;

RUNNING THENCE westerly and southerly along the land of the New York State Department of Transportation the following courses and distances:

1. North 81 degrees 36 minutes 13 seconds West 448.68 feet;
2. South 8 degrees 23 minutes 47 seconds West 291.00 feet to the northerly line of Sunrise Highway Extension;

THENCE North 81 degrees 36 minutes 13 seconds West along the northerly line of Sunrise Highway Extension 372.93 feet to a point;

THENCE North 9 degrees 10 minutes 30 seconds East 94.69 feet to a point;

THENCE North 80 degrees 49 minutes 30 seconds West 254.00 feet to a point;

THENCE South 9 degrees 10 minutes 30 seconds West 98.14 feet to the northerly line of the Sunrise Highway Extension.

THENCE westerly along the northerly line of the Sunrise Highway Extension and along the northerly line of the North Service Road of the Sunrise Highway Extension the following courses and distances:

1. North 81 degrees 36 minutes 13 seconds West 1220.53 feet;
2. On a curve to the right with a radius of 970.00 feet for a distance of 867.81 feet;
3. North 30 degrees 20 minutes 39 seconds West 284.61 feet to the easterly line of the land of the New York State Department of Transportation;

RUNNING THENCE Northerly and westerly along the land of the New York State Department of Transportation the following courses and distances:

1. North 37 degrees 53 minutes 17 seconds East 615.47 feet;
2. North 52 degrees 06 minutes 43 seconds West 453.05 feet to the easterly side of the Westhampton-Riverhead Road;

THENCE North 37 degrees 52 minutes 53 seconds East along the easterly line of Westhampton-Riverhead Road 541.38 feet;

THENCE South 80 degrees 01 minutes 57 seconds East 123.23 feet;

THENCE North 9 degrees 50 minutes 43 seconds East 231.68 feet to the northerly side of Westhampton-Riverhead Road;

THENCE North 37 degrees 52 minutes 53 seconds East along the northerly side of the Westhampton-Riverhead Road 685.51 feet to the point of place of BEGINNING.

15 (12/75)

Appendix 1.1-2

p1 of 5

New York State Department of Environmental Conservation

MEMORANDUM

Received from
NYSDEC Region 1

TO: H. Berger
FROM: J. Heil J. Heil / ebp
SUBJECT: ABANDONED DRUM SITE - OAKVILLE

DATE: August 19, 1983

In a section of the Pine Barrens, north of Westhampton, in an area known as Oakville, approximately 130 drums of an asphaltic type material have been abandoned in a wooded area.

The Region has been trying to have the drums collected for proper disposal. Recently the Commissioner allocated a portion of the State Superfund monies to clean abandoned drum sites. Nominations were requested from the Regions. In deft prose, we described Oakville siting sole source aquifer and Pine Barrens. We were lacking in one critical area - knowledge that the waste is hazardous. We requested assistance from State Health - no response yet.

Last week a Solid Waste Central Office person called to ask if analyses had been performed because a list of candidate sites was being readied for the Commissioner. I had to say no; however, I gave him the following reasons why the cleanup should receive a high priority:

- Sole source aquifer/Pine Barrens
- Only site in Region 1
- Publicity will show area that Superfund actually works
- Job is simple - Drums are on the ground and contain solids
- The site is on a future Superfund Site list, thus the State will pay a consultant \$2,000. - \$3,000. to look at the site and write a report indicating the drums should be removed.

Let's use the money now for removal - not consultants. The reason for this memo is if per chance you're speaking to the Commissioner, you could plug this project for the Region describing the Superfund protecting the groundwater and letting the companies paying into Superfund know that the money is being returned to the Island.

ebp
cc: A. Machlin
W. Parish

15 (12/75)

p2-15

New York State Department of Environmental Conservation

MEMORANDUM

Received from
NYSDEC Region 1

TO: Frank Ricotta, Burea of Remedial Action
FROM: Jim Heil
SUBJECT: OAKVILLE DRUM SITE

DATE: November 14, 1983

Attached for your review is a draft Request for Proposal with maps for the referenced drum removal site.

I apologize for the delay.

Marine Pollution Control has inspected the site and gave me an approximate cost of $17000.

Recommended local contractors are:

Chemical Management Inc.
Eastern Parkway
Farmingdale, NY

Chemical Pollution Control Inc.
120 South 4th
Bay Shore, NY

DeVito Cesspool Service Inc.
15 Orenoco Drive
Bay Shore, NY

Marine Pollution Control
375 Dunton Ave.
East Patchogue, NY

RGM Liquid Waste Removal
972 Nicolls Road
Deer Park, NY

If we can provide assistance, please call.

cc: A. Machlin

Received from
NYSDEC Region 1

p3 of 5

REQUEST FOR PROPOSALS

REMOVAL AND DISPOSAL OF SOLID HAZARDOUS WASTE

OAKVILLE, SOUTHAMPTON (T), SUFFOLK (C), NY

The New York State Department of Environmental Conservation, Bureau of Remedial Action, 50 Wolf Road, Albany, NY herewith requests cost quotations from permitted hazardous waste transporters to remove approximately 113 abandoned drums of solid hazardous waste from two locations in the Oakville section of Southampton (T), Suffolk County, Long Island, New York. The drums shall be transported via permitted vehicles to an approved disposal location.

MATERIAL: The material is a solid asphaltic like material contained in approximately 130 unmarked, rusted drums. The drums are in seven locations within the same geographic area. Some drums have ruptured and material is solidified on the surface of the ground. The material to a depth of one foot shall also be removed. The material shall be considered a hazardous waste. The Contractor shall be responsible to determine an accurate drum count.

ANALYSIS RESULTS: There are no analytical results available. The Contractor shall, under the price quoted, include all laboratory analyses required by the disposal site. Copies of analytical data shall be provided to the Bureau of Remedial Action.

LOCATION: The drums are located in two separate areas in Oakville:

1. N/O Sunrise Highway (State Route 27), E/O Old Riverhead Road (County Road 31), S/O Riverhead Quogue Road (County Road 104) along a L.I. Lighting Co. (LILCO) right of way of an overhead transmission lines. Access is via dirt roads and right of way. Roads are passable with standard equipment in good weather.
2. S/S dirt road off Pleasure Road. Pleasure Road is located at the north side of Exit 64, Sunrise Highway and Riverhead Quogue Road. Road is passable with standard equipment. A drawing is attached showing locations.

TRANSPORTATION: Drums can be removed and transported via bulk method. Drums do not have to be overpacked.

PERSONNEL SAFETY: Level C personnel protection is required.

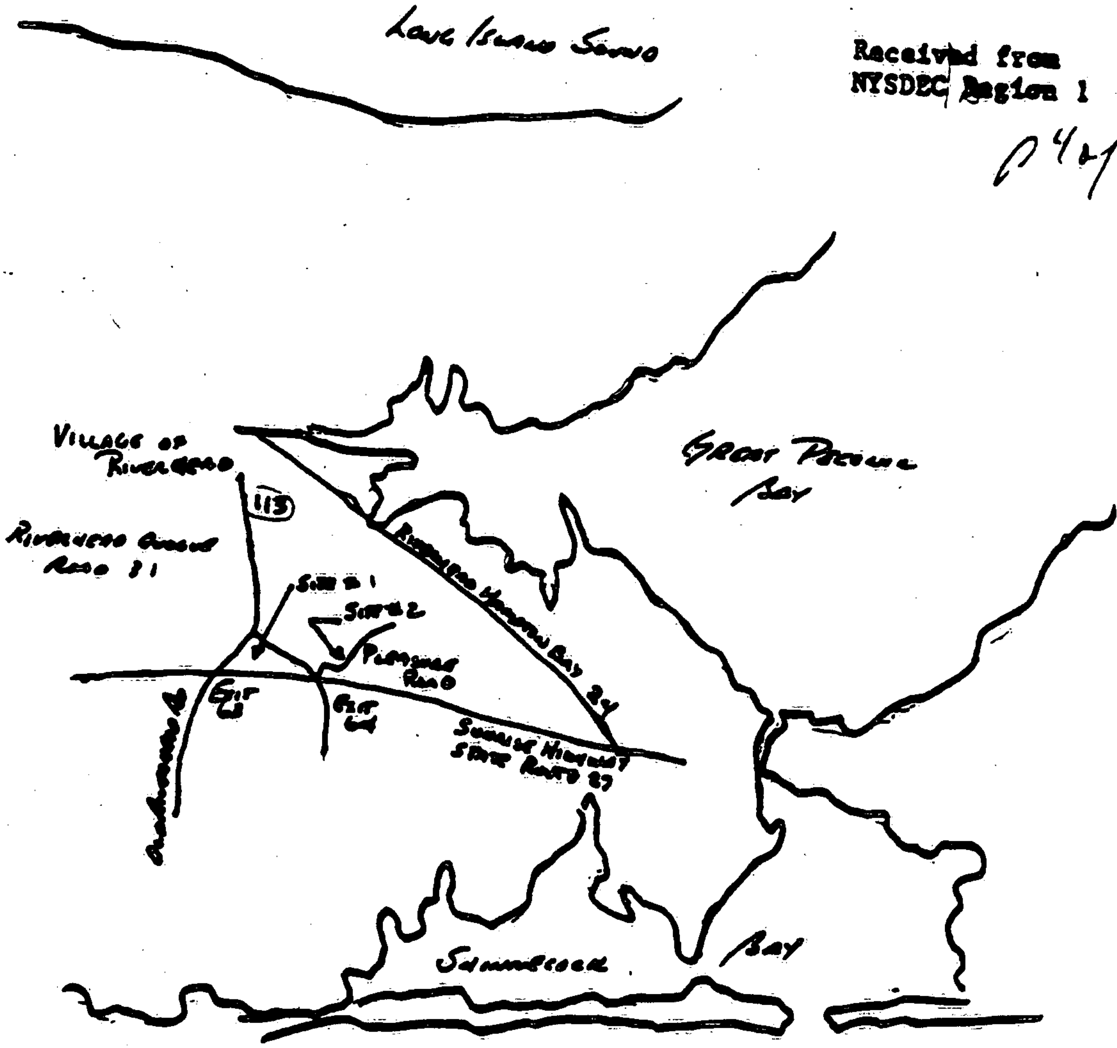
DISPOSAL LOCATION: The Contractor shall transport the drums, material and soil to an approved secure landfill. The Contractor shall indicate in the response the name and location of the disposal location.

SUPERVISION: Upon award the Contractor shall contact NYSDEC Region 1 Solid Waste Management Unit, prior to commencement of removal. A NYSDEC representative shall be on site during drum removal and loading operations.

MANIFEST: A manifest shall be used by the Contractor with NYSDEC listed as the generator.

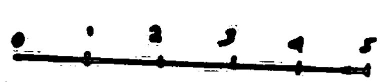
Received from NYSDEC Region 1

p 4 of 5



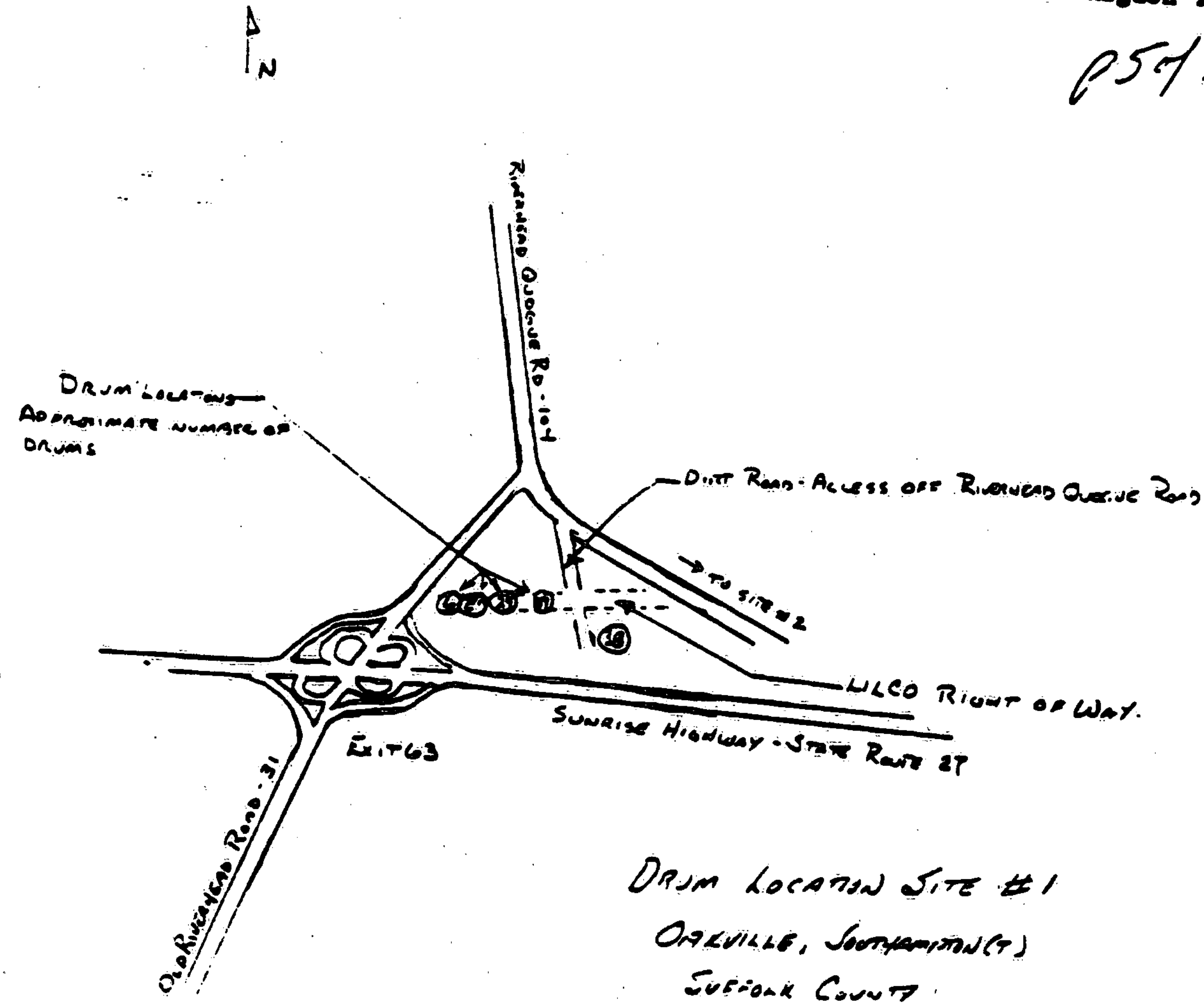
Oakville Drum Site
Key Map
Southampton Town
Suffolk County

Scale in Miles

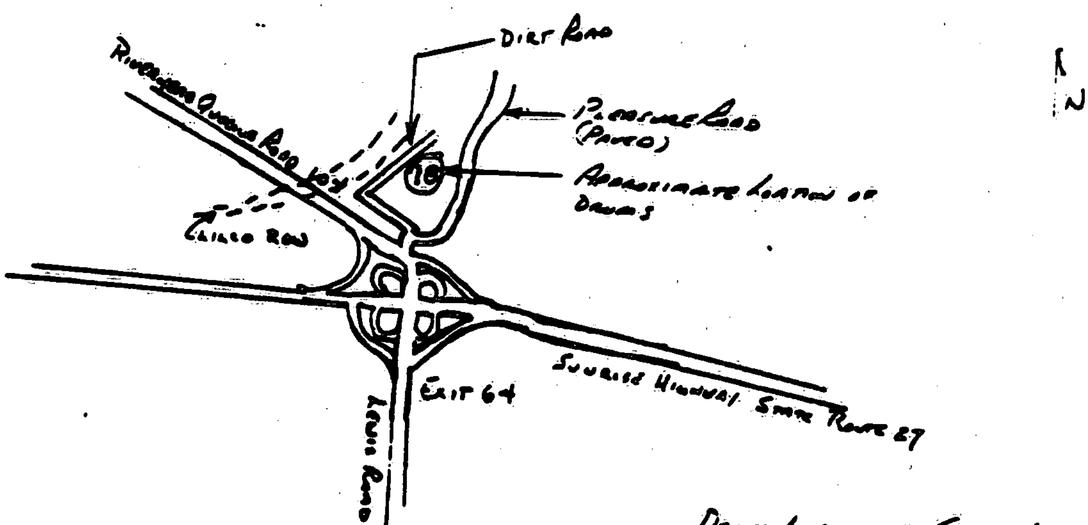


Received from
NYSDEC Region 1

p5of5



Drum Location Site #1
Oakville, Southampton (T)
Suffolk County
Scale 1 inch = 3000'   11-83



Drum Location Site #2
Oakville, Southampton (T)
Suffolk County

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

Appendix 1.1-3

COMMUNICATIONS RECORD FORM

Distribution: ( ) Oakville drum site (WJF)/ULCO
( ) ______________, ( ) ______________
( ) Author

Person Contacted: Ken Jones Date: 10-29-86

Phone Number: (516) 283-6020 Title: Chief, Fire Marshal

Affiliation: Town of Southampton Type of Contact: phone

Address: 116 Hampton Rd Person Making Contact: L Wilson
Southampton NY 11968

Communications Summary: Called 10-29-86 at 1420.
Said he was aware the asphalt material at the [illegible] site were placed there by the state highway dept.

Suggested to call Bobby Schwartz, the highway supervisor, (516) 727 1731

He (Ken Jones) indicated that neither drum site (WJF or ULCO) were considered imminent threat to the public from fire or explosion hazard...

(see over for additional space)

Signature: Lawrence Wilson

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

Appendix 1.1-4

COMMUNICATIONS RECORD FORM

Distribution: ( ) Oakville dump Site, ( ) ____
( ) ____, ( ) ____
( ) Author

Person Contacted: Bobby Schwartz Date: 10-29-86

Phone Number: (516) 727-1731 Title: Hwy Supervisor

Affiliation: ~~NYS DOT~~ Type of Contact: phone

Address: State Hwy Dept, Hauppauge NY Person Making Contact: L Wilson

Communications Summary: Mr Schwartz had no knowledge of the drums at the Oakville site. He does have several storage yards which contain the same type of material ~~to~~ one of which is on Rt. 31 only a mile from the LILCO site, but does not believe the drums at the dump site are from the State Hwy dept.

He mentioned that about 10 years ago a lot of road tar was rejected by his department because it was partially crystalized and that the drums may have been the ones dumped at Oakville. He does not have a record of the vendor of these drums.

Mr Schwartz said he would go to the site and look at the materials to determine if it is ~~[illegible]~~ road tar.

(see over for additional space)

Signature: Lawrence Wilson

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

Appendix 1.1-5

COMMUNICATIONS RECORD FORM

Distribution: ( ) Calverton Drum Sites, ( ) ____________
( ) ____________, ( ) ____________
( ) Author

Person Contacted: Bobby Swerty Date: 10-30-86

Phone Number: (516) 727-1231 Title: Hwy ~~Superintendent~~ Supervisor

Affiliation: NYS Department of Transportation Type of Contact: phone

Address: Hauppauge, NY Person Making Contact: L. Wilson

Communications Summary: Mr Swerty visited the Calverton LILCO site with Carroll Kost of the DOT environmental division. He stated the barrels were definitely not from his department.
The barrels contain Stayright ~~and~~ Co. coating for curing cement and crack & joint sealers.
Also Mr. Kost has a file on the site.

Carrol Kost (516) 360-6219

(see over for additional space)

Signature: Larry Wilson

Appendix 1.1-6

EA SCIENCE AND TECHNOLOGY

A Division of EA Engineering, Science, and Technology, Inc.

COMMUNICATIONS RECORD FORM

Distribution: ( ) Oakville Drum Sites (NYCF) (LILCO)

( ) ______________ , ( ) ______________

( ) Author

Person Contacted: Darrell Kost Date: 10-30-86

Phone Number: (516) 360-6219 Title: Environmental Affairs

Affiliation: NYSDOT Type of Contact: Phone

Address: Hauppauge, NY Person Making Contact: L Wilson

Communications Summary: Mr Kost returned my call and confirmed that he had accompanied Mr Schwartz on 10-29-86 to the Oakville Drum Site LILCO. He said the drums of asphalt material was crack + joint sealer used on highways and the barrels of powder was Stayright Curing used to cure concrete. He said he had accompanied an NYDEC representative to the site in 1983 and relayed this same information to them. At that time ~~the~~ many of the barrels were clearly marked NYCF... which was disolved in ~~19~~ 1968. It is his opinion that the materials were left there by the contractor that built the Sunrise Hwy in the early 1970's.

I described the Oakville NYCF site and the materials there. He had not been there but suspected the drums contained the same road material.

(see over for additional space)

Signature: Larry Wilson

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

Appendix 1.1-7

COMMUNICATIONS RECORD FORM

Distribution: ( ) Oakville Drum Site (WJF) (HLCO)
( ) ____________, ( ) ____________
( ) Author

Person Contacted: Stan Honig Date: 10-31-86

Phone Number: (516) 360-6044 Title: Engineer

Affiliation: ~~[illegible]~~ NYSDOT Type of Contact: Phone

Address: Hauppauge N.Y. Person Making Contact: L. Wilson

Communications Summary: Mr Hart of the NYDOT had stated that he suspected the contractor who built the Sunrise Highway was responsible for the Oakville sites.

Mr Honig stated that the contractor who built the section of the Sunrise in Oakville was Henderson Brothers of Valley Stream.

(see over for additional space)

Signature: Laurence Wilson

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

Appendix 1.1.8

COMMUNICATIONS RECORD FORM

Distribution: ( ) Oakville Drum Site (WJF)(LLCO)
( ) ________, ( ) ________
( ) Author

Person Contacted: Rick Lutyen Date: 10-31-86

Phone Number: (516) 472-8021 Title: Engineer

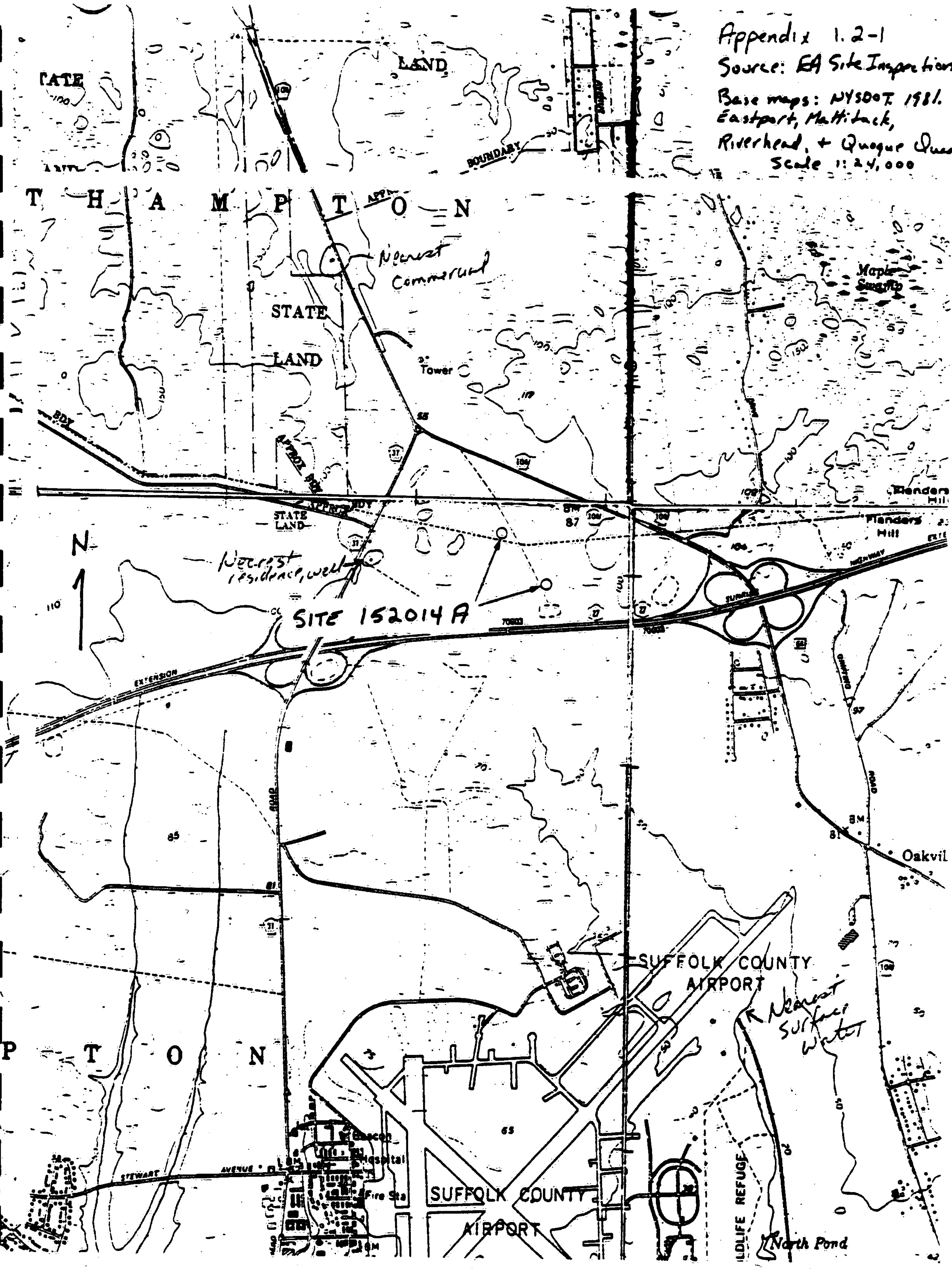
Affiliation: Henderson Bros Construction Type of Contact: phone

Address: Valley Stream, NY Person Making Contact: L. Wilson

Communications Summary: Mr Lutyen had no knowledge of the drums at Oakville. He said that the supervision of the Sunrise highway work was ideal. He also claimed the section of highway through Oakville may have been built by another company.

(see over for additional space)

Signature: Larry Wilson



Appendix 1.2-1
Source: EA Site Inspection
Base maps: NYSDOT 1981.
Eastport, Mattituck,
Riverhead, + Quogue Quad
Scale 1:24,000
STATE
LAND
BOUNDARY
T H A M P T O N
Nearest
Commercial
STATE
LAND
Tower
Maple
Swamp
Flanders
Hill
STATE
LAND
N
Nearest
residence, well
SITE 152014 A
EXTENSION
Oakvil
SUFFOLK COUNTY
AIRPORT
Nearest
Surface
Water
P T O N
Beacon
Hospital
Fire Sta
STEWART
AVENUE
SUFFOLK COUNTY
AIRPORT
WILDLIFE REFUGE
North Pond

Appendix 1.3-1
1 of 4

HYDROGEOLOGIC DATA FROM SELECTED WELLS AND TEST HOLES IN SUFFOLK COUNTY, LONG ISLAND, NEW YORK

By

H. M. Jensen and Julian Soren

LONG ISLAND WATER RESOURCES BULLETIN NUMBER 3

Prepared by the U. S. Department of Interior, Geological Survey, in cooperation with the New York State Department of Environmental Conservation, the Nassau County Department of Public Works, the Suffolk County Department of Environmental Control, and the Suffolk County Water Authority..

Published by

SUFFOLK COUNTY DEPARTMENT OF ENVIRONMENTAL CONTROL

1971

HYDROGEOLOGIC DATA FROM SELECTED WELLS AND TEST HOLES IN SUFFOLK COUNTY, LONG ISLAND, NEW YORK

By

H. M. Jensen and Julian Soren

INTRODUCTION

Suffolk County, N. Y., comprising roughly the eastern two-thirds of Long Island along with several smaller islands has an area of about 920 square miles (fig. 1). The western half of the county is mainly suburban; the eastern half is more rural. The population of Suffolk County has increased sharply from less than 200,000 in 1940 to about 1.1 million in 1970. However, most of the increase has occurred since 1950, when the population was about 275,000.

The fresh-water supply for the county is obtained solely from the underlying ground-water reservoir. The major hydrogeologic units in the ground-water reservoir are summarized in table 1, and a generalized section showing the vertical relation of these units is shown in figure 2. Ground-water pumpage increased from an average of about 42 mgd (million gallons per day) in 1950 to about 131 mgd in 1969 (New York State Conservation Department, written commun., May 1970). The projected water use in Suffolk County in 1990 for an estimated population of 2 million is about 300 mgd (New York State Conservation Department, Division of Water Resources, 1970, p. 26-27).

Water-related problems associated with increased population and attendant increased ground-water development are of considerable concern to the water-resources managers of Suffolk County. To help supply the hydrologic information needed to anticipate and cope with these problems, the U.S. Geological Survey is participating in a cooperative program of water-resources studies with the Suffolk County Water Authority, the Suffolk County Department of Environmental Control, and the New York State Department of Environmental Conservation. Several reports have been published as a result of the cooperative program. (See "Selected References.") One of the best known and most widely used of those reports is New York State Water Power and Control Commission Bulletin GW-18, "Mapping of geologic formations and aquifers of Long Island, New York" (Suter, de Laguna, and Perlmutter, 1949). That report includes three major sections: (a) a fairly detailed description of the surface and the subsurface geology of Long Island; (b) a detailed table of geologic correlations of well logs; and (c) a series of maps showing pertinent surficial features and structure contours on the tops of key hydrogeologic units.

3 of 4

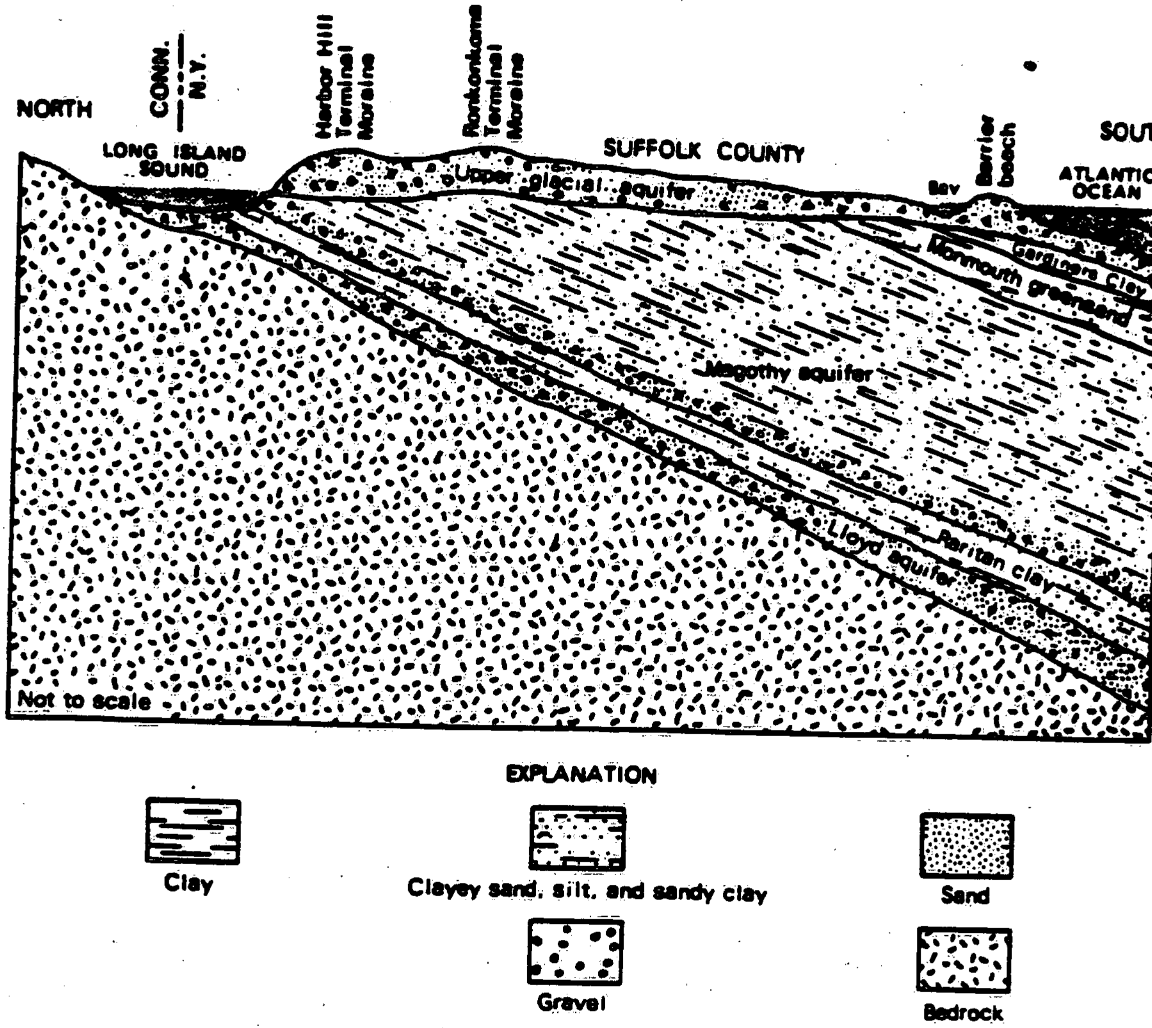


Figure 2.--Generalized section showing major hydrogeologic units in Suffolk County, N.Y.

484

Table 1.--Major hydrogeologic units in Suffolk County, N. Y.

Hydrogeologic unit 1/	Geologic name	Approximate thickness (feet)	Description and water-bearing character
Upper glacial aquifer	Holocene and upper Pleistocene deposits, and Mannetto Gravel	0-750	Mainly brown and gray sand and gravel of moderate to high hydraulic conductivity; also includes deposits of clayey glacial till and lacustrine clay of low hydraulic conductivity. A major aquifer.
Gardiners Clay	Gardiners Clay	0-75	Green and gray clay, silt, clayey and silty sand, and some interbedded clayey and silty gravel; of low hydraulic conductivity. Unit tends to confine water in underlying aquifer.
Jameco aquifer	Jameco Gravel	Not known	Not identified in Suffolk County.
Monmouth greensand 2/	Monmouth Group	0-200	Interbedded marine deposits of dark-gray, olive-green, dark-greenish-gray, and greenish-black glauconitic and lignitic clay, silt, and clayey and silty sand. Unit has low hydraulic conductivity and tends to confine water in underlying aquifer.
Magothy aquifer	Matawan Group-Magothy Formation, undifferentiated	0-1,100	Gray and white fine to coarse sand of moderate hydraulic conductivity. Generally contains sand and gravel beds of low to high hydraulic conductivity in basal 100 to 200 feet. Contains much interstitial clay and silt, and beds and lenses of clay, of low hydraulic conductivity. A major aquifer.
Raritan clay	Clay member of the Raritan Formation	0-200	Gray, black, and multicolored clay and some silt and fine sand. Unit has low hydraulic conductivity and tends to confine water in underlying aquifer.
Lloyd aquifer	Lloyd Sand Member of the Raritan Formation	0-500	White and gray fine-to-coarse sand and gravel of moderate hydraulic conductivity and some clayey beds of low hydraulic conductivity. Not highly developed as an aquifer.
Bedrock	Undifferentiated crystalline rocks	Not known	Mainly metamorphic rocks of low hydraulic conductivity; surface generally weathered; considered to be the bottom of the ground-water reservoir. Not a source of water in Suffolk County.

1/ Adapted largely from Cohen and other (1968, p. 18).

2/ Name adopted in this report.

Appendix 1.3-2
1of 17

Geology of Brookhaven National Laboratory and Vicinity, Suffolk County New York

By WALLACE DE LAGUNA

STUDIES OF SITES FOR NUCLEAR ENERGY FACILITIES—
BROOKHAVEN NATIONAL LABORATORY

GEOLOGICAL SURVEY BULLETIN 1156-A

This report concerns work done on behalf of the U.S. Atomic Energy Commission

This series of reports provides a basis for evaluating results of a possible nuclear incident upon the hydrologic environment

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON: 1963

STUDIES OF SITES FOR NUCLEAR ENERGY FACILITIES—BROOKHAVEN NATIONAL LABORATORY

GEOLOGY OF BROOKHAVEN NATIONAL LABORATORY AND VICINITY, SUFFOLK COUNTY, NEW YORK

By Wallace de Laguna

Abstract

In connection with the construction and operation of atomic research facilities at the Brookhaven National Laboratory, the U.S. Geological Survey made a study of the geologic and ground-water conditions at and near the Laboratory. The area is in central Suffolk County, about 60 miles east of New York City, and extends in a 20-mile-wide strip across the island from Long Island Sound on the north to the Atlantic Ocean on the south. The geologic fieldwork consisted of examination of surface outcrops and the supervision of the drilling of and examination of samples from shallow test wells 100 to 200 feet deep and two deep test wells about 1,600 feet deep.

The gently rolling land surface at the Laboratory is bordered by two lines of hills; the Harbor Hill moraine on the north, and the Ronkonkoma moraine on the south. A broad flat, relatively featureless outwash plain extends south from the Ronkonkoma moraine to the tidal swamps, bays, and barrier beaches, which form the southern boundary of the area. The Carmans, Forge, and Peconic Rivers, and their tributaries, carry most of the surface water.

Six principal stratigraphic units, some containing subdivisions of local importance, were recognized in the test holes and surface exposures. At the bottom is the southeasterly sloping bedrock of Precambrian age, which is at a depth of about 1,500 feet beneath the Laboratory. Above the bedrock is the Raritan formation of Cretaceous age about 500 feet thick, which is divided into the lower Lloyd sand member and an upper clay member. Resting on the clay member of the Raritan formation is about 900 feet of sand, sandy clay, and some gravelly beds, which have been tentatively assigned to the Magothy (?) formation. The Gardiners clay, an interglacial deposit of Pleistocene age, overlies the Magothy (?) formation in much of the area. The Gardiners is 10 to 20 feet thick at Brookhaven National Laboratory, but it thickens appreciably to the south. Above the Gardiners clay are upper Pleistocene deposits, which have a maximum thickness of about 200 feet. Locally these deposits are divided into an unidentified unit of sand and gravel characterized by a greenish color, a unit of silt and clay recognized near Manorville, and the Harbor Hill and Ronkonkoma moraine deposits and associated outwash deposits. Recent deposits of gravel, sand, silt, and clay are restricted to stream channels, bays, and beaches, and are generally less than 40 feet thick.

Fresh water under artesian pressure occurs in several permeable zones in the Raritan and Magothy(?) formations. Most of the water in the upper Pleistocene deposits is unconfined and fresh, and it is the principal source of supply. Recent deposits are not a source of water except for small supplies at scattered localities on the barrier beaches.

INTRODUCTION

PURPOSE AND SCOPE OF INVESTIGATION

In the fall of 1946, the War Department, then in charge of the atomic energy program, requested the U.S. Geological Survey to prepare a preliminary report on the possible water-supply problems of the proposed nuclear research laboratory at Camp Upton. In the fall of 1947, the Geological Survey began a detailed investigation of the ground-water conditions in the vicinity of the Laboratory with particular reference to the effect of a hypothetical accidental release to the environment of radioactive wastes. The routine operation of Brookhaven National Laboratory does not constitute a hazard because of the very stringent precautions that the Laboratory exercise in handling and disposing of radioactive materials. The work on which the present report is based began in March 1948. During the first 2 years, 2 deep test wells and about 12 shallow observation wells were drilled. As a guide to the installation of test wells, an attempt was made to obtain information on the subsurface geology by earth-resistivity observations, but the method was found to be poorly adapted to the conditions in the area.

During this same period, 95 samples of surface and ground waters were collected and shipped to Washington for analysis. On the basis of the data provided by this work, a second water-sampling program was set up in November 1950 to monitor the surface-water and ground-water supplies of the area, but this sampling was stopped in the summer of 1953 because the program was felt to be unsound.

Some instrumental leveling was done in the first year or two, and in 1949 the Topographic Division of the Geological Survey established a network of bench marks covering the area of immediate interest. This made it possible to convert water-level measurements to a sea-level datum so that accurate water-table contour maps could be drawn.

A more detailed study of the hydrology began in 1950; a detailed pumping test was run at the end of that year. In 1951 the observation-well net was expanded, and in 1952 a study was made of the hydrology of the Carmans River. At the same time, an attempt was made to estimate the amount of water lost annually by evaporation and by transpiration so that an estimate could be made of the recharge to the ground-water reservoir.

Attempts were made during the first year to measure the rate of movement of the ground water directly by tracers. The work provided answers which seemed to be valid, but it was dropped because of the complexity of the theoretical and practical problems involved. Some laboratory work with dye solutions was attempted later to illustrate the pattern of movement of contaminated liquids, but again problems involved in faithfully representing natural conditions were not satisfactorily solved.

The investigation was made under the immediate supervision of M. L. Brashears, Jr., and J. E. Upson, former district geologists. The organization and preparation of the report were coordinated by C. V. Theis and J. E. Upson.

PREVIOUS INVESTIGATIONS

Previous work on the hydrology and geology of Long Island has dealt either with Long Island as a whole or with the western part. In 1903 the water-supply problems of Greater New York were studied in detail by the Commission on Additional Water Supplies and described in a report by Burr, Hering, and Freeman (1904). This report related primarily to the occurrence and availability of ground water in Nassau County and western Suffolk County. In 1906, this study was enlarged to investigate the possibility of developing 250 mgd. (million gallons per day) of water from Suffolk County by extending the Brooklyn aqueduct eastward along the south shore through Patchogue, Moriches, and Quogue. Branches and collecting works were to tap, among other sources, the Carmans River and the lower Peconic. A report on this study was made by Spears (1908). Because of the general interest in the problem of water supply at this time, and as the result of a cooperative agreement with the Commission on Additional Water Supply, the U.S. Geological Survey made a study of both the geology and the hydrology of all Long Island in the years 1902–05. The results of this investigation were published under the authorship of Veatch and others (1906). Later, geologic investigations were made by Fuller (1914).

In 1932, the U.S. Geological Survey returned to the study of Long Island under cooperative agreements with the New York State Water Resources Commission (formerly Water Power and Control Commission) and with Nassau County. Later, these agreements were extended to include Suffolk County.

The principal publications dealing with central Suffolk County that have resulted from these cooperative investigations are listed under "References cited." These reports are concerned mainly with the problem areas of western Long Island, and little has been published

3/18

for Suffolk County except for the reports on the mapping of the aquifers by Suter, de Laguna, and Perlmutter (1949), and the mapping of the water table by Lusczynski and Johnson (1952). Among the independent workers who have contributed to the glacial geology of Long Island are MacClintock and Richards (1936) and Fleming (1935).

LOCATION OF AREA

Brookhaven National Laboratory is on the site of Camp Upton, formerly an Army post during World Wars I and II. It is nearly in the geographical center of Long Island, about 60 miles east of New York City. (See fig. 1) The Laboratory tract is an irregular polygon that is roughly rectangular and about 2.5 miles on a side.

Brookhaven National Laboratory lies in a strip across the island about 13 miles wide extending approximately north-south between long 72°45′ and 73° W. This area (fig. 1) is referred to in this report as the Upton area from the post office address of the Laboratory, and it is the area of principal concern in the hydrologic part of this report.

The geologic studies cover a somewhat wider area (fig. 1), as it was felt desirable to include some information from adjoining areas where wells had been drilled deep enough to reach beds of Cretaceous age. This larger area, extending from about long 73°07′30″ W. on the west to long 72°37′30″ W. on the east, a distance of about 26 miles, is here called central Suffolk County.

WELL-NUMBERING SYSTEM

Numbers of wells mentioned in the text and shown on illustrations of this report are those assigned by the New York State Water Resources Commission. Wells are numbered serially and are designated by letter prefix according to the county in which they are: S for Suffolk County and N for Nassau County. Records and logs of wells referred to in this report are either published in Bulletins GW 4, 9, and 31 of the New York Water Resources Commission or may be examined at the Geological Survey office at 1505 Kellum Place, Mineola, N.Y. The location of wells referred to in this report are shown on plate 1.

TOPOGRAPHY

Brookhaven National Laboratory is on gently rolling ground in the upper part of the Peconic River valley, which is bordered by two lines of low hills. These extend beyond the limits of the valley east and west nearly the full length of Long Island and form its most prominent topographic features. The northern line of hills, known as the Harbor Hill moraine, lies along the north shore of Long Island; the

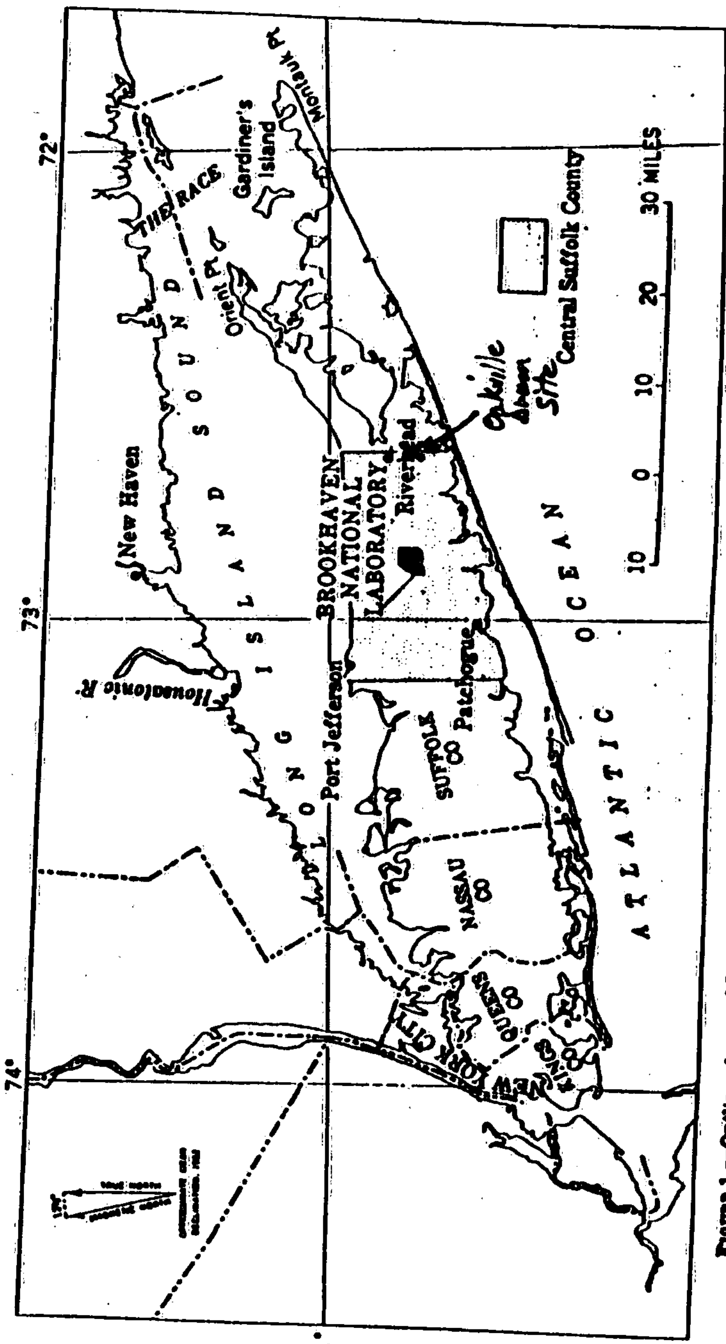


FIGURE 1.—Outline of map of Long Island, showing location of Brookhaven National Laboratory and adjoining areas.

southern line of hills, the Ronkonkoma moraine, trends along the center of Long Island and passes just south of Brookhaven National Laboratory. (See pl. 1.)

Just west of Brookhaven National Laboratory, the two moraines are connected by a narrow north-south ridge, which gives the neighboring hamlet of Ridge its name. East of this ridge, and enclosed by it and two moraines, is the Manorville basin (pl. 1), on the relatively high west margin of which are the main Laboratory grounds. The basin forms the upper drainage area of the Peconic River. It is partly enclosed on the east south of Calverton by Bald Hill, a salient of the Ronkokoma moraine, so that the surface drainage of the Manorville basin is poor, and much of the land near the river is swampy. East of Calverton, the valley widens and forms the Riverhead basin (pl. 1).

West of the north-south ridge is the narrow, straight valley of the Carmans River, branches of which formerly drained Artist Lake and a pond at Middle Island. To the east, along the south margin of the Harbor Hill moraine are two large kettle holes, Long Pond and Deep Pond.

Just west of the Carmans River, another ridge extends north from Coram Hill and nearly joins one of the wide low spurs extending south from the Harbor Hill moraine. West of this ridge, between the two moraines, is the Selden basin (pl. 1), a wide shallow basin that has no surface-drainage outlet.

South of the Ronkonkoma moraine is a comparatively flat featureless plain of irregular width. This surface slopes gently to the south, where it merges into a swamp and then passes under Great South Bay and Moriches Bay. The shoreline is indented by many small estuaries that are the drowned mouths of the small streams that drain the plain. The principal irregularities of the plain south of Brookhaven National Laboratory are the valleys of the Carmans River, which head north of the moraine, and the much shorter Forge River which heads in the Ronkonkoma moraine just south and southeast of the Laboratory.

Between the mouths of the Carmans and the Forge Rivers, the south shore bays are divided by a wide tongue of land which extends nearly across to Fire Island Beach. This tongue is occupied by the summer community of Mastic and by the southern part of another community called Mastic Beach. To the east is Moriches Bay; to the west is Great South Bay. The bays are bordered on the south by a long narrow line of barrier beaches.

The north shore of central Suffolk County is bordered by a long line of steep bluffs overlooking Long Island Sound. These bluffs form a series of shallow arcs, concave northward, each of which is 8 to 10 miles long. The line of bluffs is broken by several small embayments such as at Mount Sinai Harbor and Wading River. These embayments have flat swampy bottoms and are bordered on the south by an abrupt line of hills. West of Port Jefferson the shoreline is much less regular, because it comprises a succession of bays and necks.

SUMMARY OF STRATIGRAPHY

Six principal stratigraphic units, some of which include subdivisions of minor importance, were recognized in the test drilling at Brookhaven National Laboratory and have been identified in well logs and at exposures in central Suffolk County (table 1). Their general relationships are indicated diagrammatically in figure 2, and their lithology, as determined in the two deep test wells at Brookhaven National Laboratory, is indicated in figure 3. Plate 2 shows the lithologic characteristics of the uppermost units, particularly those of Pleistocene age. Plate 1 shows the location of wells used in preparing the report; the cross sections are shown in plate 2.

At the base is the oldest of the stratigraphic units, the bedrock of pre-Cretaceous age, to which no formational name has been attached. Above the bedrock is the Raritan formation of Cretaceous age, which is as much as 500 feet thick. This formation has two members. The lower, as much as 300 feet thick, called the Lloyd sand member, is composed of coarse-grained sand, gravel, and some clay. The upper member, as much as 200 feet thick, is mostly clay and is called the clay member of the Raritan formation. Overlaying the Raritan formation is the Magothy(?) formation, also of Cretaceous age. Beneath Brookhaven National Laboratory this formation consists of about 900 feet of mostly clayey sand, and it includes beds of clay and of sand and gravel.

Beneath most of the laboratory tract, and in general beneath the southern half of central Suffolk County, the Magothy(?) formation is overlain unconformably by the Gardiners clay of Pleistocene age. Within Brookhaven National Laboratory and for a few miles to the south, test wells showed the Gardiners clay to be 10 to 20 feet thick and to be composed of clay containing sand and gravel. Still farther south, along the ocean shore, the Magothy(?) formation is overlain by 150 feet or more of clay, silt, and clayey sand, which in texture, color, and composition is somewhat like the Gardiners clay, but which resembles neither the Magothy(?) below nor the upper Pleistocene deposits above. This material is tentatively referred to as the Gardiners clay, although it is possible that detailed paleontologic studies may show that other units are present in some places (Perlmutter and Crandell, 1959).

6 of 13

Table 1.—*Physical character and water-bearing properties of the geologic units underlying central Suffolk County*

System	Series	Geologic unit		Approximate thickness (feet)	Physical character of deposits	Water-bearing properties
Quaternary	Recent	Recent deposits		0–40	Gravel, sand, silt, some clay, organic matter, and shell fragments.	Permeable beds contain fresh and salt water near shoreline. Clay and silt are local confining units.
	Pleistocene	Upper Pleistocene deposits	Moraine deposits and outwash	0–150	Moraine deposits composed of unsorted boulders, gravel, silt and clay; compact in places. Outwash composed chiefly of gravel and sand. Locally, thin loesslike deposits of silt and clay at and near surface.	Moraine deposits generally of low permeability but permeable sandy zones are common. Outwash generally highly permeable and productive. Water-table conditions prevail almost everywhere.
			Clay at Manorville	0–60	Silt and clay, laminated, gray and brown.	Relatively impermeable local confining unit.
			Unidentified unit	0–50	Fine to coarse sand, greenish; some silt and clay.	Contains water under water-table conditions. Tapped by few wells.
		Unconformity?				
		Gardiners clay		0–150	Clay and silt, grayish-green; some lenses of sand and gravel.	Relatively impermeable. Confining unit in southern part of area.
		Unconformity				
Cretaceous	Upper Cretaceous	Magothy(?) formation		0–1,000	Sand, fine to coarse, clayey, lenses of clay; coarse basal zone containing gravel. Lignite is abundant. Light and dark gray are predominant colors.	Low to high permeability. Tapped by few wells but has several productive zones. Water is under artesian pressure.
		Unconformity				
		Raritan formation	Clay member	150–200	Clay and silt, dark- and light-gray; some red and white; some lenses of sand.	Relatively impermeable, extensive confining unit.
			Lloyd sand member	130–300	Sand and gravel, gray; some beds of sandy clay and clay and silt.	Permeable zones are potential sources of water. Not tapped by pumping wells at present. Water is under artesian pressure.
		Unconformity				
Precambrian(?)		Bedrock		....	Granitic-gneiss, upper 30–50 feet moderately to highly weathered.	Relatively impermeable. Not an aquifer.

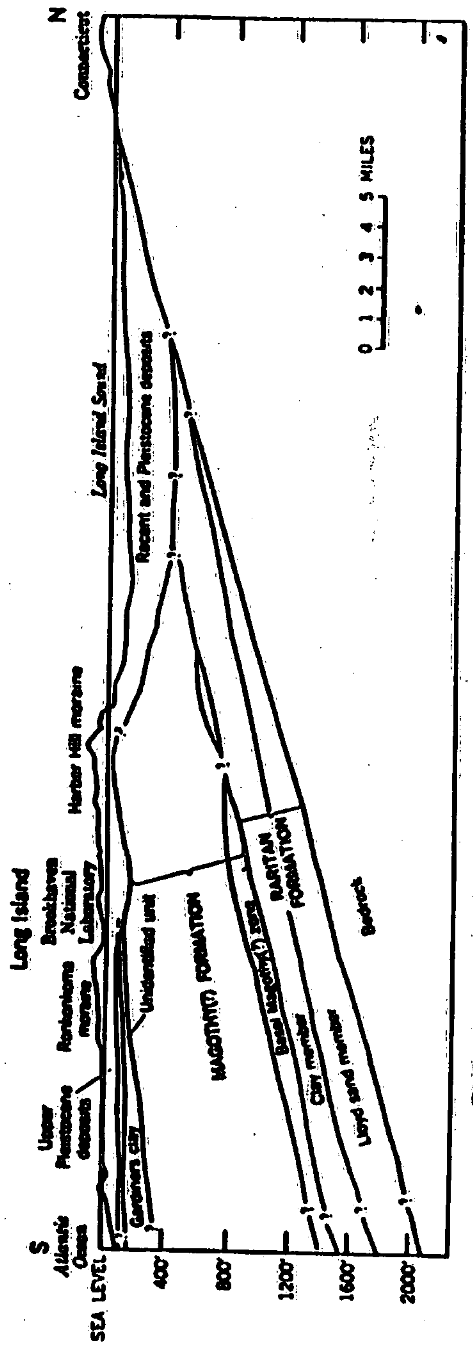


FIGURE 2.—Generalized cross section along long 72°52'30" W. in central Suffolk County.

The sixth major stratigraphic unit is called the upper Pleistocene deposits, an informal term used to describe the glacial deposits which, in nearly all Long Island, overlie the Gardiners clay or the Magothy(?) formation. Most of these deposits consist of sand and gravel which, with local silt and clay, form the stratified outwash and morainal deposits of presumed Wisconsin age. Their maximum known thickness is about 200 feet. The formational units into which Fuller (1914, p. 80–176) divided these deposits have not been recognized within the area of this report. However, some distinctive subdivisions were recognized. For example, overlying the Gardiners clay in the southern half of the report area is a greenish sand 25- to 50-feet thick of uncertain origin, but apparently the oldest outwash material in this area. It has not been named and, therefore, is called here the unidentified unit. At Manorville, and probably beneath a surrounding area of several square miles, there is a varved clay in the middle of the upper Pleistocene deposits. In the lower part of the Peconic River valley, beneath the south-shore beaches and in a buried valley south of Mount Sinai Harbor, the upper Pleistocene deposits include a complex series of alternating layers of sand, silt, and clay, some fossiliferous, which may in part represent the Gardiners clay. Despite these variations, however, most of the upper Pleistocene deposits form a comparatively uniform blanket of sand and gravel.

The current differentiation of stratigraphic units on Long Island is the result of gradual refinement of knowledge based largely on data from wells. Substantial contributions were made by Thompson, Wells, and Blank (1937), and more recently by Suter, de Laguna, and Perlmutter (1949). Most of the formations recognized here occur nearly everywhere beneath Long Island.

BEDROCK

The bedrock which underlies the unconsolidated deposits is known principally from well records. It includes hard, dense schist, gneiss, and granite similar in character to that which underlies much of the mainland in nearby parts of New York and Connecticut. These rocks were previously thought to be of Precambrian age, but now many geologists believe that some of them are metamorphosed early Paleozoic age sediments. Data from well records and samples on Long Island do not warrant any identification except of rock type.

Two deep test wells (S6409 and S6434, pl. 1) penetrated bedrock at a depth of nearly 1,600 feet beneath Brookhaven National Laboratory. The bedrock was found to be a hard, banded, granitic gneiss. Microscopic examination showed it to be composed of about 50 percent plagioclase (oligoclase and andesine) feldspar, about 50 percent quartz, about 1 percent biotite, and a trace of garnet. The plagioclase feldspar in the sample from well S6434 contained a little more sodium than that from S6409; otherwise, the two samples were identical.

This bedrock contains no openings capable of holding or transmitting appreciable quantities of water, thus it forms the base of the water-bearing material beneath Brookhaven National Laboratory.

In Connecticut, the bedrock includes, in addition to the gneiss and schist, a body of sandstone, shale, and diabase of Triassic age which could conceivably extend south from New Haven as far as Long Island. Seismic studies (Oliver and Drake, 1951, p. 1295) suggest that it does not. No rocks of Triassic age have been found in any wells drilled on Long Island.

CONFIGURATION OF THE BEDROCK SURFACE

The shape of the upper surface of the bedrock of Long Island is best known beneath the west end of the island (de Laguna and Brashears, 1948). Here the bedrock surface, as indicated by well records, has a maximum relief of about 100 feet, except where it is near the surface and may have been modified by erosion in Pleistocene or Recent time. The apparent low relief and local deep weathering of the bedrock in western Long Island as shown by well logs (de Laguna and Brashears, 1948, p. 8) suggest that the surface had reached an advanced stage of peneplanation. Indeed, the surface is considered to be part of the Fall Zone peneplain (Von Engeln, 1942, p. 353). The most recent map of the bedrock surface underlying Long Island (Suter, and others, 1949, pls. 8, 9, and 10) shows that this surface slopes southeast about 80 feet per mile beneath most of Long Island. It seems to slope more southerly at the east end of Long Island. If the surface represents a peneplain, the relief on the bedrock surface in the Brookhaven area is not likely to be greater than 50 to 100 feet.

FORMATIONS OF LATE CRETACEOUS AGE

RARITAN FORMATION

The Raritan formation rests directly on highly to slightly weathered bedrock. The formation is probably entirely continental and was laid down as a costal-plain deposit by streams flowing off the uplifted Fall Zone peneplain. The name Raritan was applied to the Long Island deposits by Veatch and others (1906, p. 23) who correlated the formation with deposits of the same name in New Jersey. On Long Island the formation has two fairly distinct members; the Lloyd sand member below, and a clay member above.

The formation probably occurs beneath all central Suffolk County. Northward the Lloyd sand thins and probably pinches out beneath Long Island Sound, and the clay member may do likewise. Southward the formation extends a considerable distance offshore, possibly as far as the continental shelf (about 100 miles), where the beds probably have lithologic characteristics different from those beneath Long Island.

At many wells the position of the contact with overlying deposits, and in fact between the members themselves, cannot be defined precisely. Nevertheless, the units are distinctive in their general characteristics.

LLOYD SAND MEMBER OF THE RARITAN FORMATION

The Lloyd sand member is a fairly uniform and extensive unit consisting predominantly of sand and gravel with some clay. It is known only from well logs. At the two deep test wells (S6409 and S6434) at Brookhaven National Laboratory, it is separated from the hard crystalline bedrock by 15 to 30 feet of tough, white, structureless clay containing scattered angular grains of quartz, which is considered to be weathered bedrock. At the same wells, the upper contact of the Lloyd sand member with the overlying clay member is fairly definitely marked by a change in the lithology of the sediments.

As shown by the columnar section (fig. 3) of well S6409, the Lloyd sand member is about 300 feet thick. It is largely composed of fine to coarse sand containing silt and clay in the interstices. It also includes beds of clay or sandy clay and coarser textured beds that contain gravel. Near the middle, the unit consists chiefly of sand and coarse gravel, which contains some pebbles at least 2 inches in diameter. The voids between the pebbles are for the most part filled with sand and some clay. The porosity of the unit is, therefore, appreciably less than that of a well-sorted sand or gravel. A somewhat similar sequence of material was found at well S6434. The dominantly sandy material which makes up the bulk of the unit here rests directly on highly weathered bedrock.

The pebbles and the sand found in the Lloyd member at Brookhaven National Laboratory and elsewhere on Long Island are composed almost entirely of quartz. This composition suggests that the material was derived from a region in which the climate was warm and the rate of erosion slow, so that all but the most resistant material was entirely decomposed. The clay is entirely or dominantly kaolinite, a mineral indicative of complete weathering.

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The cores, the drill cuttings, the rate of drilling, and other evidence suggests that the Lloyd found at Brookhaven National Laboratory is in many respects similar to that found in western Suffolk, Nassau, Queens, and Kings Counties where more than a hundred wells have been drilled into it. In both the Laboratory wells and in a well drilled at Port Jefferson, however, the interstitial clay seems to be tougher and more tightly packed than it is farther west.

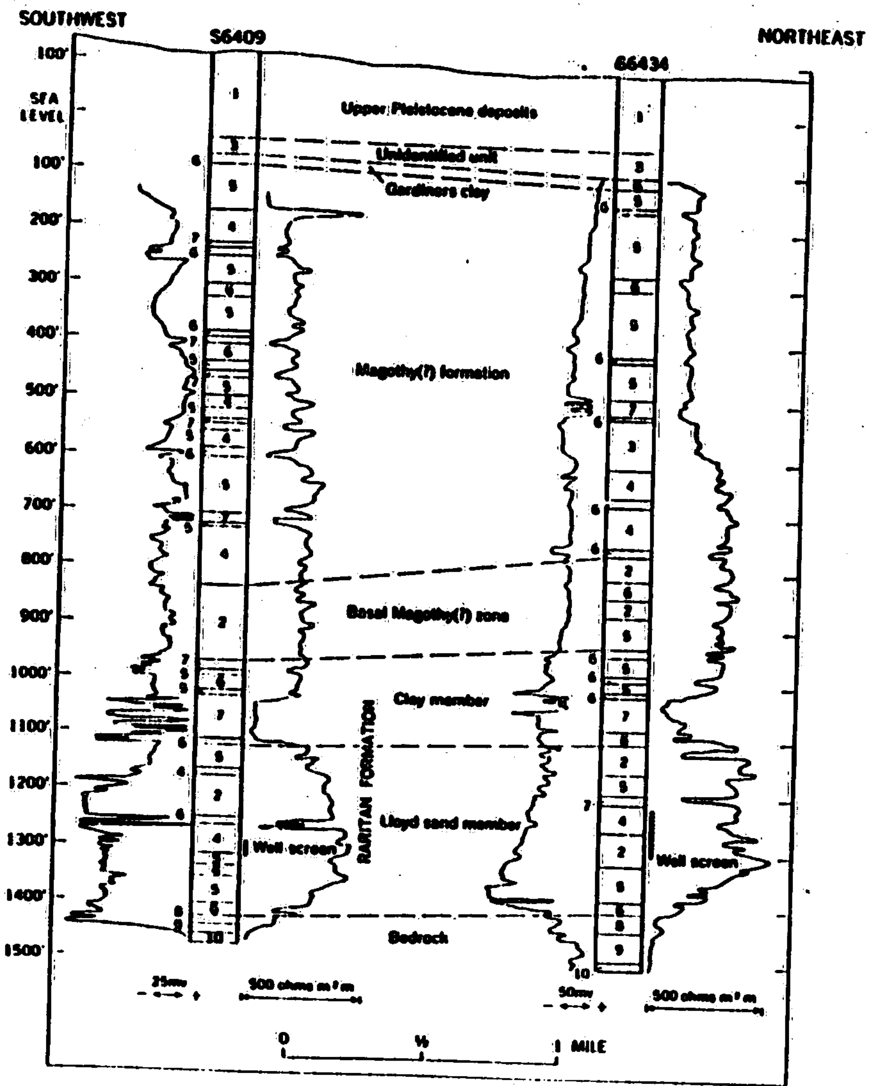

FIGURE 8.—Columnar sections and electric log of deep test wells at Brookhaven National Laboratory.

EXPLANATION

Numbers arranged in order of estimated decreasing permeability

Unit No.	Description of unit
1	Sand, or sand and gravel, clean; little or no silt or clay.
2	Sand, coarse, or sand and gravel; includes some clay.
3	Sand, fine or medium; includes some clay.
4	Sand, coarse, or sand and gravel; mixed with considerable clay and containing beds of clay.
5	Sand, fine to medium; mixed with considerable clay and containing beds of clay.
6	Clay, mixed with some sand, and containing beds of clayey sand.
7	Clay, tough; containing little sand.
8	Bedrock weathered. Original rock texture no longer visible, but material has not been transported or sorted by water.
9	Bedrock, weathered. Original igneous texture visible, but most minerals except quartz much altered chemically.
10	Bedrock, fresh. May show some staining or discolora[tion].

In the western part of Long Island, the Lloyd ranges in thickness from about 350 feet on the south shore to a few tens of feet along the north shore, where in a few places it is absent. These variations in thickness apparently represent the form in which the Lloyd was originally deposited. At Port Jefferson the Lloyd has a thickness of 135 feet, which shows that it thins to the north in central Suffolk County also. Indeed, it is possible that beneath Long Island Sound, the Lloyd sand pinches out and that the overlying clay member of the Raritan overlaps it and extends beyond it. (See fig. 2.) Thus, although penetrated by only a few wells in the report area, the Lloyd probably is a continuous unit of substantial thickness.

CLAY MEMBER OF THE RARITAN FORMATION

The clay member, which overlies the Lloyd sand, makes up the balance of the Raritan formation. At Brookhaven National Laboratory, the top of the clay member is 975 feet below sea level at well S6409 and 940 feet below at S6434. In both wells, its thickness was less than 200 feet. It is largely composed of tough dark-gray or black lignitic clay and some red and white clay and includes some sandy layers and thin lenses of gravel. It also contains some light-gray silty and sandy clay. It is not clearly bedded, as the textures and colors grade into one another. Zones which contain well marked, narrow bands of light silty clay alternate with darker clay which may represent annual variations in rate of deposition, as between a rainy and dry season.

The clay member shows little if any systematic variation in thickness on Long Island. In most of the carefully logged wells that penetrate it, the clay is about 200 feet thick, and at least some of the greater or lessor thicknesses reported may be due to difficulty in placing the contacts, for these depend only on differences in lithology. In parts of King County, and in northern Queens and Nassau Counties, where the top of the clay member is at or near sea level, the member is much less than 200 feet thick and in places it may be absent. This is probably due to local erosion, most of which probably took place in late Tertiary or Pleistocene time. Where the clay member is found at greater depths, as in central Suffolk County, there is no evidence of erosion, but the data are scanty. Thompson, Wells, and Blank (1937, p. 455) suggest that in Kings and Queens Counties, channels were cut into the clay member at the close of Raritan time and then filled with sand or other permeable material at the beginning of Magothy(?) deposition. There is no evidence that such deep erosion and deposition took place within the area investigated; the Lloyd member in central Suffolk County is everywhere covered by the clay member.

Like the Lloyd member below and the Magothy(?) formation above, the clay member has not yielded any fossils except plant remains and is probably nonmarine. The scattered pieces and grains of lignite, the widely distributed spores and pollen, the casts of twigs and leaves, and the possible varving suggest deposition on a coastal plain by generally sluggish but sometimes flooded rivers, that drained a deeply weathered area of moderate relief. It is possible, but unlikely, that some of the rivers crossing this plain maintained their channels in the same place over long periods of time, because aggrading streams commonly build up both their banks and their beds and then shift some distance laterally to lower ground. Accordingly, the coarser grained materials found locally probably are lenses of limited extent both horizontally and vertically. However, at places these may act as relatively permeable but devious paths for the movement of water.

WATER-BEARING PROPERTIES

The Lloyd sand is one of the most important aquifers on Long Island largely because it yields adequate supplies of good quality water in areas, generally beneath the margins of Long Island, where supplies from overlying formations are inadequate or are contaminated by or readily subject to contamination by sea water. The Lloyd can supply water under these circumstances because it is overlain by the relatively impermeable and virtually continuous blanket of the clay member.

The problem of how fresh water moves into and out of the Lloyd has been considered by many investigators. Such movement may occur by means of valleys cut through the clay member or by slow seepage of water through the clay (Suter, and others, 1949, p. 16). As there is little evidence of deep buried valleys in the clay member in central Suffolk County, it is likely that most of the movement of water into and out of the Lloyd is by means of slow seepage through the overlying clay. Lusczynski (oral communication) speculates that if the clay member has an average permeability of 0.2 to 0.3 gpd per square ft, then quite possibly all the water in the Lloyd reaches the unit by percolation through the clay member. Wenzel (1942, p. 13) gives the permeability of a clay (sample No. 2278) that is similar to the clay member of the Raritan as 0.2 gpd per ft, which suggests that there is no compelling need to assume permeable channelways. In any event, movement of water through the clay member of the Raritan either up or down doubtless is very slow in most places.

Although the water from the Lloyd is relatively high in iron content, the usefulness of the aquifer in central Suffolk County is more seriously compromised by the probability of poor yield, as exemplified by the two Brookhaven National Laboratory wells. In the western part of the island, many wells tapping the Lloyd sand member have a specific capacity between 10 and 20, which means that they yield 10 to 20 gpm per ft of drawdown. Test well S6409 at Brookhaven National Laboratory was finished with 25 feet of screen and had a specific capacity of about 2. The other deep test well, S6434, was underreamed and gravel-packed and finished with 80 feet of screen, but it had a specific capacity of only 2.5. The principal reason for these low yields seems to be the toughness of the interstitial clay in the deposits, which made it difficult to wash the clay out thoroughly during the development. Much of the same type of tough interstitial clay was found in the cores from test well S5901 at Port Jefferson.

MAGOTHY(?) FORMATION

The Magothy(?) formation in central Suffolk County is a thick body of continental deposits composed of lenses of sand, sandy clay, clay, and some gravel. It rests on the Raritan formation and is in turn unconformably overlain by upper Pleistocene deposits. The greatest thickness, revealed by drilling, is about 1,000 feet. The present upper surface of the Magothy(?) on Long Island is an erosional surface, and the original total thickness is not known.

The type area of the Magothy formation is in Maryland along the Magothy River, where it was first described by Darton (1893, p. 407–419). W. O. Crosby (1910) and later Horace R. Blank (written communication, 1935) suggested that the Cretaceous deposits overlying the Raritan formation on Long Island were a greatly thickened extension of the Magothy formation of New Jersey. Later work (Perlmutter and Crandell, 1959, p. 1060–1076) shows that the uppermost part of the Magothy(?) formation beneath the south shore of Suffolk County includes marine beds possibly equivalent in age to the Monmouth group of New Jersey. In this report, as in recent publications by Survey authors, the name Magothy when applied to the upper part of the Long Island Cretaceous, is followed by a question mark to indicate the doubt. Examination of pollen and spores may lead to both a reliable correlation of the Cretaceous deposits on Long Island with those of New Jersey and to the establishment of a useful type sequence for Long Island itself.

The Magothy(?) formation underlies most of Long Island except for parts of Kings and Queens Counties and northwestern Nassau County where it was removed by erosion. It may extend beneath Long Island Sound, but is probably truncated by erosion and overlain by Pleistocene deposits. (See fig. 2.) To the south, the Magothy(?) formation, like the Raritan, extends out under the sea, where it also probably changes from a terrestrial to a marine deposit.

The formation crops out at only a few places on Long Island, most of them in northern Nassau County, so that the formation is known chiefly from well records. At test wells S6409 and S6434, the Magothy(?) is about 885 and 819 feet thick, respectively. (See fig. 3.) Well S5901 at Port Jefferson, 12 miles northwest of Brookhaven National Laboratory, passed through nearly 500 feet of the Magothy(?) formation, and well S128 about 5 miles southwest of the Laboratory penetrated about 760 feet of the Magothy(?) and did not reach the bottom of the formation.

The Magothy(?) at Brookhaven National Laboratory has about the same characteristics as elsewhere on Long Island. It is composed of beds of poorly sorted quartzose sand mixed with and interbedded with silt and clay, and locally it contains pebbles or small lenses of gravel. Sandy clay and clayey sand make up most of the fine beds, but there are also several thick beds of clay. In both of the deep test wells (S6409 and S6434), the basal 100–150 feet of the Magothy(?) contains a greater proportion of coarse-grained material. This consists partly of coarse sand and gravel that contains pebbles as much as 2 or 3 inches in diameter. The voids are largely filled with silt and soft clay, however, and the coarse-grained beds are separated by beds of sandy clay. A similar coarse-grained zone can be distinguished in most reliable well logs in other parts of Long Island (J. J. Geraghty, written communication, 1953). It is best described as a zone, immediately overlying the clay member of the Raritan, in which relatively coarse-grained permeable material is commonly found.

The Magothy(?) formation typically contains several clay layers, some of them as much as 50 feet thick. Where the Magothy(?) itself is thick, the aggregate thickness of the clay beds is nearly as great as that of the clay member of the Raritan. Even in the western part of the Island, where wells are close together, it is difficult or impossible to trace any of these clay beds from one well to the next; hence, they are probably lenticular and individually of small extent. Thus, they probably do not constitute as effective a barrier to the movement of ground water as the clay member of the Raritan formation.

WATER-BEARING PROPERTIES

Although it consists in part of beds of dense clay and layers of coarse sand and gravel, by far the greater part of the Magothy(?) formation is made up of sandy clay and clayey sand. Thus, although the formation as a whole is probably less permeable than the Lloyd because of its thickness it can transmit and store large amounts of ground water. Also, there are no effective barriers to the movement of water through the formation except locally. Wells that are constructed and developed carefully generally yield large quantities of water from all but the most clayey parts of the formation. In other parts of Long Island, the beds of gravel at the base of the Magothy(?) and the lenses of sand and gravel of smaller extent that occur at various zones within the formation also yield substantial quantities of water. The Magothy(?) is important as an alternate aquifer in the event that the water in the overlying upper Pleistocene deposits becomes contaminated.

A well near Brookhaven National Laboratory that produces water from the Magothy(?) is S5902 at Port Jefferson. The aquifer tapped by this well is apparently not the basal Magothy, but a coarse-grained zone 100 feet higher. Well S5901, only 0.2 mile from S5902, did not penetrate productive water-bearing material in the Magothy(?) and was abandoned. This is one of a very few places in central Suffolk County where difficulty has been encountered in obtaining water. At most other places, where adequate supplies of water are not available from the upper Pleistocene, ample supplies have been developed from the Magothy(?) formation.

The highly productive beds of the Magothy(?) are by no means confined to the basal zone, but there is no other zone in which a reliable supply can be predicted. Rather it is a case of drilling carefully until material of appropriate grain size and permeability is found. Both of the deep wells at Brookhaven National Laboratory penetrated considerable material in the Magothy(?) from which water might be obtained. Well S6434 was screened temporarily between 656 and 676 feet and tested by pumping. Even with only 20 feet of screen, no gravel pack, and little development the zone yielded water at a specific capacity of 15 gpm per ft of drawdown.

CONFIGURATION OF THE MAGOTHY(?) SURFACE

Between the Late Cretaceous and the end of Tertiary time, the Raritan and Magothy(?) formations were tilted gently to the south and considerably dissected by streams. The shape of the land surface thus formed is important for it is related to the thickness and distribution of the younger deposits resting on it. As these younger deposits have somewhat different hydrologic properties than the Cretaceous beds, their thickness is a matter of considerable importance to this report. In particular, extensive valleys now filled with permeable deposits occur in the western part of Long Island. If similar valleys are present in central Suffolk County, they might provide buried channelways for the movement of ground water. Although few wells penetrate to the Cretaceous in central Suffolk County, the general shape of the surface may be inferred from its configuration in the western part of the Island, where more data are available, and by inference from the general geology.

When the coastal plain formed on the Magothy(?) deposits began to be eroded, the lower reaches of the ancestral Housatonic and Connecticut Rivers probably were the first main streams flowing south or southeast across the area which subsequently became Long Island. As these streams trenched themselves, tributaries called subsequent streams developed along the outcrops of the less resistant beds and in particular along the contact of the Cretaceous deposits and the crystalline bedrock. As the main streams cut deeper, the tributaries which followed this contact migrated southward down the slope of the surface of the more resistant bedrock and removed in the process a wider and wider strip of the Cretaceous cover. The inner lowland so formed is the site of Long Island Sound, and the cuesta ridge to the south of it forms the core of Long Island. Thus, in general, the surface of the Cretaceous deposits of Long Island in pre-Pleistocene time probably consisted of gentle south-dipping slopes (dipslopes), steep north-facing slopes (scarp slopes) scarred by short steep valleys, and a few main stream valleys, the original consequent streams, which traversed across or detoured around the cuesta ridges.

Whether or not such a major stream valley crossed central Suffolk County is not known. Veatch and others (1906, pl. 6*A*) suggest that the ancestral Housatonic River at first crossed the area not far west of the present site of Brookhaven National Laboratory. Well records suggest that there is a buried valley extending at least a few miles south of Mount Sinai Harbor, but there is no evidence to show that this valley extends across the island. Even if the Housantonic River crossed the island, such a remnant of its valley might well be a short segment only across the higher part of the postulated cuesta ridge.

Veatch (1906, pls. 6*B and* 6*C*) believed that the ancient Housatonic and Connecticut Rivers were eventually deflected westward where they entered the inner lowland, as the result of steam piracy, and flowed across the west end of Long Island as the ancient Sound River. Veatch thought that this river flowed to the west rather than to the east, partly because the Delaware, Susquehanna, and Potomac Rivers turn west where they cross the basal Cretaceous beds, and partly because well records revealed segments of buried valleys in southern Queens County and in south-central Kings County. Veatch (1906, pl. 6*D*) suggested also that the ancestral Housatonic and Connecticut Rivers were deflected east around the end of Long Island during the late Pleistocene time.

Many of the well records in central Suffolk County are generalized, and the correlations are somewhat questionable. However, within and a short distance south of the Laboratory area, several test wells were cored and the samples carefully studied. Interpretations as to the position of the Cretaceous surface at these wells are considered to be reasonably accurate. Data were particularly sought in the area south and southeast of Brookhaven National Laboratory, for this is the general direction of movement of the ground water from the Laboratory. These core identifications show that the Cretaceous surface is 92 feet below sea level at the southwest corner of the laboratory tract (well S6409, pl. 2). From here the surface slopes down gently to the south and southeast to 149 feet below sea level at well S6457 near Route 27, and it slopes down to about 140 feet below sea level at well S6460 (pl. 2). Still farther south, the position of the upper surface of the Cretaceous beds is uncertain, but it may be as much as 250 to 300 feet below sea level to the south according to interpretation of drillers' logs. Conceivably some of the clay correlated as Gardiners may be part of the Magothy(?) formation.

Beneath Brookhaven National Laboratory north of well S6409, the Cretaceous surface slopes to the north and is 161 feet below sea level at the northeast corner of Brookhaven National Laboratory (well S6458, pl. 2). Still farther north, few reliable well records are available, but the surface probably rises along the north shore in the vicinity of Shoreham, perhaps even to altitudes above sea level. West along the north shore, near Mount Sinai Harbor, is the valley already referred to, and still farther west, in Port Jefferson, well records and one exposure show clearly that the Cretaceous surface is 50 feet or more above sea level. A small buried ridge which appears to trend east-west beneath the southern boundary of Brookhaven National Laboratory may be part of a minor cuesta.

East of Brookhaven National Laboratory, beneath the valley of the modern Peconic River, there may be a buried valley of considerable extent. Wells at Manorville and Riverhead reached the Magothy (?) at considerable depths below sea level.

The total relief on the surface of the Cretaceous deposits in central Suffolk County is about 400 feet. Except for parts of the north shore, which are outside of the area of immediate interest to Brookhaven National Laboratory, the Cretaceous surface is very gently sloping, and the valleys and ridges referred to are but very minor undulations on a generally flat and nearly level surface.

DEPOSITS OF PLEISTOCENE AGE

During the Pleistocene epoch there were four major glacial stages. These were separated by three relatively warm interglacial stages. Long Island is about at the southern limit of the last major advance of the ice, the Wisconsin stage, and perhaps near the limit of the ice front of the earlier glacial stages.

In central Suffolk County, the deposits of Pleistocene age comprise: the Gardiners clay, believed to be a shallow marine deposit of the last major interglacial stage; and a complex sequence of glacial and nonglacial deposits, probably all of Wisconsin age, grouped under the name upper Pleistocene deposits. (See pl. 2.) The Jameco gravel found in western Long Island and the Mannetto gravel identified near the Nassau-Suffolk County boundary have not been recognized in central Suffolk County.

GARDINERS CLAY

In about the southern half of central Suffolk County, the Magothy (?) formation is overlain unconformably by a fossiliferous marine clay that probably is the equivalent of the Gardiners clay as defined and described by Fuller (1914, p. 92). The type locality of this formation is on Gardiners Island at the east of Peconic Bay. It is not possible to trace the deposits from the type locality to Long Island proper; therefore, the name Gardiners clay in this report is restricted to the fossiliferous clay beneath much of the southern part of the area that is between the upper Pleistocene deposits above and the Magothy (?) formation below.

In most of Long Island, except where it has locally been deformed by ice shove, the top of the Gardiners clay is about 50 feet or more below present sea level. In central Suffolk County, it is everywhere about 100 feet below sea level or deeper. The nonmarine clays exposed at or about sea level along the north shore of Long Island, described by Fuller as Gardiners clay, are no longer believed to be part of that formation (Weiss, 1954, p. 148).

As used in this report, the Gardiners clay comprises three somewhat different types of material that occur in three separate bodies and

that may or may not be contiguous with one another. These bodies are somewhat different lithologically and thus have somewhat different effects on the movement of ground water.

One of these is a thin body of clay or clay and sand that extends, in the area where it is best known, from about the northern border of Brookhaven National Laboratory as far south as Route 27 at well S6457 (pls. 1, 2). Similar deposits were penetrated by wells S128 and S95 to the west. Most wells in the area do not penetrate the Cretaceous beds, so the extent and continuity of the Gardiners is not known. However, it appears to underlie a belt around 6 miles wide north and south, roughly north of Route 27, and extending east and west across central Suffolk County. In this belt, the Gardiners clay is about 10 feet thick. The altitude of its upper surface is 101 feet below seal evel at S6456 (pl. 2), 91 feet below at S 6459 (pl. 2), and 130 feet below at S 6457 (pl. 1). Where penerated by these wells, the formation is composed of tough dark-gray to green sandy clay that contains a few pebbles. The green color is in part due to a small amount of glauconite and a small amount of green clay minerals.

A few pelecypod and gastrapod shells were found in the Gardiners clay at several of the wells in this area. At well S6409, a thin layer of dark brown peat underlies the clay. None of this material was particularly diagnostic; the peat being described by E. S. Barghoorn (Harvard Univ., written communication, 1952) as yielding only conifer pollen grains, Lycopodium spores, and other evidence of arboreal flora, which suggests a climate similar to, or more probably, slightly colder than the present.

Microfossils in the Gardiners were somewhat more indicative. Lawrence Weiss, formerly of the Geological Survey, prepared a report (1954) of the foraminifera obtained from cores and other samples. The foraminifera, and to a lesser degree the diatoms (K. E. Lohman, written communication, 1950), suggest strongly that the thin northern part of the formation in the vicinity of the laboratory was deposited in a shallow body of brackish water, not unlike the bays that fringe the southern shore of Long Island today. The fossil forms are largely identical with those living in the present bays. They do not resemble the forms living in the less well protected and more saline water of Long Island Sound. Similar forms are also found in protected waters to the north along the New England coast, which suggests that the Gardiners clay was formed during an interglacial period when the climate was similar to or perhaps a little colder than now. This conclusion agrees with the less conclusive evidence furnished by the peat. Also indicative of a somewhat colder climate is the altitude of the top of the clay, which suggests that sea level at the time of deposition was 50 to 100 feet lower than at present. This could be true if the glaciers and polar icecaps of the time were more extensive than those of today. MacClintock and Richards (1936, p. 330–331) suggest that the Gardiners clay is the equivalent of the Cape May formation of New Jersey, and they indicated on a map the probable position of the shoreline in New Jersey, New York, and Connecticut when the Cape May formation and the Gardiners clay were deposited. On this map, the sea level is shown as higher than at present in New Jersey, but lower than at present in Long Island and Connecticut. This would suggest that the land had been susequently tilted, or that the two formations are not actually contemporaneous.

The second body of the Gardiners clay, as here considered, comprises the thick clay penertated by wells S5591, S8549, and others (pl. 2), south of Route 27. The upper surface of this clay is at about 130 feet below sea level, but the lower contact slopes seaward so that the unit attains its greatest apparent thickness at well S8549 (pl. 2), where it consists of a nearly continuous body of tough generally green clay. A similar sequence, not quite so thick, was penetrated in well S5591 (pl. 2). Predominantly clay beds, as much as 80 feet thick, occur at depths of 130 feet below sea level at other southerly wells such as S6187 and S152. Thus, these thick clays may extend along the entire shore from Blue Point to Westhampton Beach and possibly beyond.

Clays of such thickness seem to be inconsistent with the apparent mode of deposition of the thin clay to the north. Also, the basis for an age determination is not firm. Hence, the thick clay may not be entirely of Gardiners age and may include beds of the Magothy(?) formation. Similar thick clays have been found farther west beneath Fire Island Beach, and Cretaceous foraminifera have been found in some of them (Perlmutter and Crandell, 1959, p. 1066–1067). However, the writer feels that lithologically the clay here discussed is not typical of the Magothy(?), and believes that if it is not Gardiners it must wholly or partly belong to some intervening formation hitherto unidentified.

A third body of deposits tentatively correlated with the Gardiners clay comprises certain fossiliferous sands and clays found in wells in the Riverhead area and south of Mount Sinai Harbor. As explained in foregoing paragraphs, it is likely that valleys were cut into the surface of the Magothy(?) formation at both of these places during the Tertiary. These valleys may have been invaded by the sea during deposition of the Gardiners clay. At well S5140 in Riverhead, Weiss (1954) found microfossils similar to those present in the Gardiners clay beneath Brookhaven National Laboratory and considered that the beds represent a shore facies of the Gardiners clay. These fossils

were present in two sand layers and in an intervening clay penetrated between depths of 70 and 101 feet below sea level. Shells also were reported in fine sand at 33 feet below sea level at about 1.5 miles east-northeast, but no samples were available for study. The fossiliferous sand 33 feet below sea level is presumably pre-Wisconsin if it is overlain by glacial outwash. However, at this comparatively shallow depth, the overlying material may be of Recent age.

In the Mount Sinai Harbor area, clay or sand and clay containing shells have been found in several wells at depths below sea level as follows: S43, −60 to −200 feet; S2650, −10 feet; S9087, −60 to −70 feet; and S108 at about −100 feet. These are approximate figures, and as the area was overridden by later ice sheets, the clay may have been deformed by ice shove. The foraminifera from well S2650 were briefly examined by N. M. Perlmutter who found them similar to those described by Weiss from the Gardiners clay. The material is therefore, like the sand at Riverhead, probably interglacial, and possibly contemporaneous with the Gardiners clay.

WATER-BEARING PROPERTIES

With respect to water-bearing properties, the chief concern is with the predominantly clayey parts of the Gardiners that lie beneath and south of Brookhaven National Laboratory. Beneath the laboratory and roughly north of Route 27, the thin supposedly lagoonal portion of the Gardiners, as here distinguished, lies between the highly permeable upper Pleistocene deposits above and the moderately permeable Cretaceous formations below. The effectiveness of this part of the Gardiners clay as a barrier to ground-water movement is an important factor in determining whether contamination reaching the ground water in the glacial sands would be carried down to the lower aquifers. The beds of tough clay are probably relatively impermeable, but they do not appear to occur in sufficiently thick and continuous strata to form a fully effective barrier to ground-water movement. If the Gardiners clay was indeed formed in a bay such as those which now fringe the south shore of the Island, and if the sea level rose from −140 feet to −90 feet during deposition, the formation would then probably consist of overlapping lenses of clay with zones of coarser grained silt and sand around the margins and local silty or sandy zones throughout. Indeed, the logs of wells S6457 and S6459 indicate that such sandy zones exist. Accordingly, this part of the Gardiners clay is apparently not a continuous and complete barrier to ground-water movement over the whole area, although the tough clay zones probably are effective barriers locally.

Certain hydrologic data, discussed more fully by de Laguna (written communication, 1962) bear out this conclusion. The hydraulic head differential across the clay in the area south of the Laboratory, as measured at wells S6456, S6459, and S6460 is on the order of half a foot. The clay therefore must be sufficiently impermeable to restrict somewhat the movement of water, which here is from upper to lower strata. However, the sandy zones in the clay, which as far as is known may occur anywhere, would offer relatively little restriction to the movement of water, which could then pass downward wherever the hydraulic gradient is favorable. Thus, taking the unit as a whole, water can pass through the Gardiners clay, although at a slow rate, in small amounts and probably at most places only by circuitous routes.

The thicker beds of clay and sand and clay beneath the south shore of the island, which were referred to the Gardiners clay, are doubtless appreciably more effective as a barrier to the movement of ground water than the thin beds of clay farther north. This is due not only to their greater thickness but also to the inferred greater continuity of the clays, although the log of well S1592 (pl. 2) suggests that there are sandy zones even in this material. However, the significance of these characteristics is less than in the clay to the north, because the southern clay beds lie within the area where ground water is moving upward rather than downward. The thick clay in the vicinity of well S5591 and southward greatly retards the actual movement of water from the deeper formations. In fact, it may force relatively large amounts of water to discharge upward in more northern areas, perhaps through more permeable deposits such as those penetrated by well S1592.

The scattered fossiliferous sands and clays in the Riverhead and Mount Sinai Harbor areas are impossible to evaluate hydrologically as their structure and distribution are not known. It would appear, however, that they are but a part of a geologically complex filling of the buried valleys in these areas, and that the details of the hydrology of these areas is likely to be similarly complex. These areas are remote from the Laboratory and their hydrology is of correspondingly small importance to the basic problems of this report.

UPPER PLEISTOCENE DEPOSITS

The term upper Pleistocene deposits was used by the writer in 1948 (de Laguna, 1948, p. 16) to include all the Pleistocene deposits on Long Island above the Gardiners clay. Fuller (1914, p. 106–176) divides this material into three formations: the Jacob sand, thought to grade downward into the Gardiners clay; the Manhasset formation, thick glacial deposits presumably of Illinoian age; and a thin, surficial veneer considered to be Wisconsin drift. Subsequent work

suggests that the Jacob sand is not a separate formation, and that the Manhasset formation is actually largely, if not entirely, of Wisconsin age.

The Jacob sand, as described by Fuller (1914, p. 106), consists of very fine sand, silt, and rock flour, which are plastic when wet, but which contain little true clay. The color is very light gray, or yellow or buff. Fuller gives no thickness for the unit. According to Fuller, the Jacob sand is exposed at several places in wave-cut bluffs at or near sea level along the north shore of Long Island and at the type area at Jacobs Point, 15 miles northeast of Brookhaven National Laboratory. At places, the Jacob sand grades downward into a brown silty clay which Fuller believed to be the Gardiners clay, but this clay contains no fossils and is no longer believed to be Gardiners. Also, Fuller's suggestion (1914, p. 105–106 and fig. 77) that the nonfossiliferous Jacob sand at the type locality and elsewhere along the north shore is equivalent to fine-grained fossiliferous sand which overlies the Gardiners clay on Gardiners Island probably is incorrect. This fossiliferous sand probably should be considered part of the Gardiners clay (MacClintock and Richards, 1936). In its type area the Jacob sand does not appear to be a true stratigraphic unit, but rather to comprise beds and lenses, each of rather limited extent, of fine sand, silt, and rock flour probably deposited in quiet water ponded along the ice front. Deposits comparable to the Jacob sand are not recognized in well logs beneath the central or southern part of Long Island.

The type locality of the Manhasset formation of Fuller is in Manhasset in northern Nassau County, where thick deposits of glacial sand and gravel contain a thin intercalated bed of clayey till. The lower gravel Fuller called the Hempstead gravel member, the till was called the Montauk till member (after the type locality at Montauk Point), and the gravel above the till was called the Herod gravel member, although the correlation of this particular gravel with the sand and gravel at Herod Point in central Suffolk County is also uncertain. Fuller believed that only the top few feet of till which overlies the Manhasset formation at the type locality was deposited by the Wisconsin ice sheet. This belief was based on an interpretation of the physiography with which subsequent workers have not been in agreement. Wells (1935, p. 121–122) and Fleming (1935, p. 222) state that they could find no evidence of weathering or erosion to indicate that there was an interglacial period at any time subsequent to the deposition of the Gardiners clay. The writer agrees with this opinion.

Fleming (1935, p. 216–238) proposes a three-fold subdivision of the post-Gardiners glacial material into Herod, Montauk, and Latest, as he believes that three separate advances of the Wisconsin ice were represented. The writer found no evidence in central Suffolk County, however, of three ice sheets. The glacial deposits observed in the Brookhaven National Laboratory area appear to be the product of two ice advances similar in character and probably both of Wisconsin age.

The Ronkonkoma and Harbor Hill moraines as mapped by Fuller (1914, pl. 1) are accepted with slight modification; and the bulk of the upper Pleistocene deposits are considered to be outwash from the same glaciers that formed the moraines. The chief points of disagreement with Fuller are: (1) the Manhasset formation, as defined by Fuller, is not considered to occur within the area and does not underlie the two outwash deposits at shallow depth as he believed; (2) the outwash is believed to be substantially thicker than Fuller thought; and (3) the thin till (supposedly ground moraine of the Ronkonkoma advance), which Fuller maps as underlying central Suffolk County and considerable territory to the north and west, is not believed to be present. This last unit is here replaced by Ronkonkoma and Harbor Hill outwash as discussed in the following paragraphs.

On the other hand, some units are here recognized in the upper Pleistocene that Fuller had little or no chance of observing. The first of these, called the unidentified unit (Weiss, 1954, p. 148), occurs at the base of the upper Pleistocene deposits. The second unit is clay, some of it varved, which is best known from cores from a test well at Manorville. Lastly are some thin surficial fine-grained deposits, not typical outwash, that occur in the upper part of the Harbor Hill outwash in the headwaters of the Peconic River in or near the eastern part of Brookhaven National Laboratory.

Thus in summary, the upper Pleistocene deposits in the vicinity of Brookhaven National Laboratory comprise the Harbor Hill and Ronkonkoma moraine deposits and outwash, which are indistinguishable on the basis of texture and composition alone, but which occupy somewhat different physiographic positions; and three minor units, differentiated on the basis of their composition: the unidentified unit, the clay at Manorville, and fine-grained surficial deposits of limited but uncertain extent.

UNIDENTIFIED UNIT

South of Brookhaven National Laboratory, and for an unknown distance east and west, the Gardiners clay is overlain by 25 to 50 feet of sand or clay and sand characterized by a greenish color which is referred to as the unidentified unit. Beneath the southern half of the laboratory tract, and south to Route 27, this material forms the basal part of the upper Pleistocene deposits. Its relation to the other units

in this area is shown in plate 2. Similar greenish deposits are reported in wells as far west as Patchogue (well S7519) and as far east as West Hampton Beach (wells S9973 and S152). It probably extends beyond these areas. The northern limit of the unit has been located only at Brookhaven National Laboratory where test drilling indicates that this unit extends north of well S6459 (pl. 2). To the south, the unit can be traced nearly as far as well S1592 (pl. 2), but beyond this point the greenish deposits cannot be distinguished in well logs from similar material that may be part of the Gardiners clay or older deposits. The data from other wells along the south shore of the Island are not adequate to define the unit.

The unidentified unit, in the vicinity of Brookhaven National Laboratory, where it is most clearly defined, is composed of fine- to medium-grained white and gray sand, and 5 to 10 percent of interstitial green clay. The sand grains consist mostly of quartz, but some other minerals also are present, principally feldspar, amphibole, and garnet. The green clay was identified by Clarence Ross (written communication, 1949) as nontronite, but probably there are other clay minerals present. Some broken grains of reworked glauconite are also present; and the nontronite may well have been formed by the weathering of glauconite. Elsewhere, the unit apparently contains considerable clay or sandy clay.

Samples of sand were collected for mechanical analysis from well S6456. The texture of the sample of greenish sand is not distinctive. The amounts and proportions of fine and medium sand are similar to those in some of the upper Pleistocene outwash; the content of coarse and very coarse material is small. Mineralogically the greenish sand differs from the overlying outwash mainly in the apparent absence of biotite and the presence of glauconite. It appears to have a more varied mineral content than the Gardiners clay.

The origin of the unit is uncertain, but it is here considered to be part of the upper Pleistocene deposits because of its general mineralogic and lithologic similarity to the sands of those deposits. The glauconite may well have been derived from the shallow marine deposits in Long Island Sound, then dry, by the first advance of the ice across this area, and it need not have come from the area of the Atlantic Ocean to the south.

WATER-BEARING PROPERTIES

The unidentified unit, although very similar in texture to much of the outwash, contains less coarse sand, and probably on the average a little more clay. The difference is difficult to estimate quantitatively.

However, it may be inferred that the movement of the ground water in the unidentified unit is somewhat slower than it is in the overlying material. Even a small difference may be of some importance. As shown in a later section, a body of contaminated liquid of even slightly greater density than the normal ground water will tend to sink to the bottom of the aquifer. Also, the adsorptive and ion-exchange capacity of the nontronite and glauconite in the unit is appreciably higher than that of the overlying outwash. It is concluded, therefore, that following a spill or leak, any contaminated water which sinks into the unidentified unit at the bottom of the upper Pleistocene, will move less rapidly and be subject to more adsorption than it would be in the overlying material.

MORAINE DEPOSITS AND OUTWASH

The moraine deposits and outwash comprise four separate units: the Ronkonkoma moraine, outwash and other meltwater deposits from the Ronkonkoma ice, the Harbor Hill moraine, and outwash from the Harbor Hill ice. These units are distinguishable topographically, but not lithologically with present information.

The Ronkonkoma moraine is a line of irregular hills that lies immediately south of Brookhaven National Laboratory (pl. 1). It extends eastward past South Manor, where it forms the south side of the Manorville Basin, and still farther east through Bald Hill. It also extends westward, paralleling the Carmans River valley at Yaphank, and then crosses that valley and includes Coram Hill and others to the west.

The Ronkonkoma outwash underlies and forms the sloping but fairly smooth terrain south of Brookhaven National Laboratory, and also the irregular hills on and among which the main Laboratory tract is situated. These hills are considered to be kames formed during the late stages of melting of the Ronkonkoma glacier.

The Harbor Hill moraine (pl. 1) lies along the north shore of Long Island and is of little direct concern in connection with the ground-water problems of the Laboratory. Outwash from the Harbor Hill ice, however, extends southward to within about 1½ miles of the north boundary of Brookhaven National Laboratory, and to the east it extends south of the Peconic River and underlies most of the Manorville Basin. It is believed that meltwater from the Harbor Hill ice flowed down the site of the Carmans River, through the gap in the Ronkonkoma moraine, and into the narrow tongue that broadened at the south to form a fanlike feature; the broad, flat area where the communities of Mastic and Mastic Beach are now located (pl. 1).

Within the Laboratory tract, except for the thin, surficial clay and

silt described below, all these morainal and outwash deposits are lithologically inseparable and form virtually a single water-bearing unit. As a unit, these deposits rest upon the unidentified unit and, where that unit is missing or unrecognizable, upon the Gardiners clay. At places, where the Gardiners is missing, it rests on the Magothy(?) formation. In the laboratory area, it is from 100 to more than 200 feet thick. Its thickness, altitude, relationships to underlying formations, and general lithologic characteristics are shown by the cross sections in plate 2.

The moraine and outwash deposits are a crudely stratified body of clean sand and gravel which contains very little clay or silt, and only locally a few boulders. The sand grains are mostly quartz with small amounts of alkali feldspar, mica, amphibole, and other minerals. As indicated by a few exposures, the sand is well but coarsely bedded. Individual beds are difficult to define, as variations in texture are gradational.

Cores from some of the test holes reveal thin layers of silt or clay, which at most are 1 to 2 inches thick. Thicker lenses of clay are absent in the immediate vicinity of the Laboratory, but they are exposed locally along the north shore, especially at Wildwood State Park and Rocky Point (pl. 1). These lenses of silt and clay were probably deposited in small lakes formed between the retreating face of the Harbor Hill ice sheet and the Harbor Hill moraine. They are not more than 20 to 30 feet thick, and the majority are less than 10 feet thick. They appear to be at most a few hundred yards long. All these beds of silt and clay are near sea level, and they are evidently the material identified as the Jacob sand and the Gardiners clay by Fuller (1914).

No systematic variations in texture were actually observed in the glacial outwash or moraine deposits, and indeed to detect any would probably require a statistical study of a considerable number of large samples. The data available, however, suggest that the Ronkonkoma outwash becomes finer grained south of the Ronkonkoma moraine, and that the lower part of the outwash is somewhat finer than the upper part. No such generalization appears to hold for the material north of the Ronkonkoma moraine.

WATER-BEARING PROPERTIES

Because of their similarity in structure and texture, the moraine and outwash deposits are considered a hydrologic unit. In the Laboratory area, the water table lies within what is probably the Ronkonkoma outwash, so that this deposit is of primary concern. The clean, coarse sand and gravel is very porous and highly permeable. It makes a porous soil, so that a high proportion of the rainfall infiltrates where t falls; there is virtually no surface runoff. Because of their high porosity, the deposits store large quantities of water. Because of heir high permeability, the deposits yield large quantities of water o wells and are the source of nearly all the ground water pumped in entral Suffolk County.

So far as is known there are no effective barriers to the movement of water anywhere in the unit. However, because the deposits are enticular, there may be substantial variation in permeability over hort distances. The permeability of the deposits south of the Ronkonkoma moraine may decrease slightly with depth and with distance o the south.

Some of these minor variations in water-bearing characteristics night become significant in connection with possible movement of a ontaminant. As the moraine deposits and outwash were deposited by vater flowing in general from north to south, it is reasonable to uppose that individual lenses of sand and gravel are themselves longated in this direction. Thus, there may be threads of relatively ermeable material along which water might move a little more apidly under proper hydraulic conditions. Also, there may be either ine- or coarse-grained deposits localized beneath and along the valleys f the principal streams, such as the Carmans or Forge Rivers.

Finally, as discussed by de Laguna (written communication, 1962) here is apparently a substantial difference between permeabilities in he horizontal and vertical directions.

CLAY AT MANORVILLE

A test well (S10,384) drilled by a private contractor near Manorille (pl. 1) penetrated a bed of tough clay which was underlain and verlain by outwash sand and gravel, between 2 and 33 feet below sea evel. The lower part of this clay has typical glacial varving, which ndicates that it was deposited in a lake left in the Manorville basin uring the ice retreat. Similar clay was found in well S6422 from 4 o 62 feet below sea level. East, in the Riverhead basin, several wells enetrated what are probably equivalent beds of clay 15 to 30 feet elow sea level. Three of these reached the bottom of the clay at 74, 1, and 130 feet below sea level. It is tentatively suggested that the arved clay at well S10,384 is possible interglacial, at least intersubtage, and may separate Ronkonkoma from Harbor Hill outwash. Vhether the clays penetrated by the other wells to the east and to the est are of the same unit is not known. There are, however, clay and ilt of Gardiners age at about these depths in the eastern part of the liverhead basin, and in well logs it would be impossible to distinguish

between them and the clay at Manorville. Wells for which there are reliable logs are not so located as to permit a determination of the continuity and extent of this clay. However, if the clay is post-Ronkonkoma, the temporary lake in which it formed presumably would have been limited to the north of the Ronkonkoma moraine, and the clay itself should occur correspondingly. It was not found in the Laboratory area, nor to the south of Brookhaven National Laboratory. West of the Laboratory, in the upper valley of the Carmans River, there are few data, and none to indicate the presence of a comparable clay.

The clay at Manorville, if laterally extensive, probably exerts a considerable influence on the movement of the ground water in the upper Pleistocene deposits in the area where it occurs. The water table is some 35 feet above sea level at Manorville, so that there is about 35 feet of saturated sand and gravel above the clay. The clay at well S10,384 is about 31 feet thick, and it is underlain by about 42 feet of sand and gravel. Movement of water between the upper and lower strata is certainly considerably impeded by the clay, and presumably artesian conditions prevail in the lower strata, although water-level measurements are not available to indicate the head difference. It is also possible that in some parts of the Manorville basin the water in the deposits beneath the clay flows southeastward toward and eventually to the south shore, whereas the water in the deposits above the clay discharges into the Peconic River. The clay appears to terminate, however, well to the east of the Laboratory, so that it does not influence directly the movement of ground water in the areas of potential contamination, but it may well be an important factor in the hydrology of the central and lower Peconic River valley.

SURFICIAL SILT AND CLAY

In the east third of the Laboratory area, test drilling and shallow excavations have revealed in places thin deposits of silt and clay. The material is discontinuous and unevenly distributed. It is at most 5 or 10 feet thick, and is generally found at or very near the surface; and not deeper than 20 to 30 feet. It appears to be more widespread in the slightly lower land along the Peconic River and minor headwater tributaries than in higher ground. It may have been first deposited by the wind as loess, shortly after the retreat of the ice sheets and before a vegetative cover had developed; and subsequently moved by running water and redeposited on lower land. Some of it may have originated as waterlain material, and some may be unreworked loess. The extent of the deposits is determined in part by hydrologic data.

These deposits are sufficiently fine grained so that they appreciably impede the movement of shallow ground water. They hold water at or near the land surface, and thus locally form swampy areas or ponds.

Also, they impede the downward movement of water enough so that at times when the level in the main underlying water body declines, they support perched or semiperched water bodies. Similarly, when the level in the main underlying water body rises, these fine-grained deposits confine the water under slight artesian pressure. These relationships are areally complex because the deposits are discontinuous and occur close to the water table. The deposits affect the movement of shallow water into and out of the Peconic River and associated ponds, swamps, and drainage ditches in a rather complex way, and thus they have a bearing on the possible movement of contaminated waters in and outside the eastern part of the Laboratory area.

DEPOSITS OF RECENT AGE

Deposits of Recent age comprise gravel and sand on beaches, organic matter, silt and clay in tidal swamps, gravel, and sand and silt in stream channels. These deposits are thin and discontinuous, and they occur chiefly along the shores of the present Long Island Sound, the open ocean, bays behind barrier beach and various bars, and along the channels of the few larger streams. They are not sufficiently extensive to make it important to differentiate them from underlying deposits (almost everywhere the upper Pleistocene deposits) upon which they rest unconformably.

They are generally neither thick enough nor extensive enough to comprise any appreciable ground-water reservoirs. Nearly all these deposits are remote from the Laboratory and there is no immediate problem in regard to their possible contamination.

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Appendix 1.3-3
1814

Dan Raviv Associates, Inc.
Consultants in ground water hydrology, water quality and landfill hydrology

PHASE I EVALUATION
GEOHYDROLOGIC/WATER QUALITY CONDITIONS
SUFFOLK COUNTY AIRPORT AND VICINITY
WESTHAMPTON, NEW YORK

Job No. 83C146

Prepared
for the

Environmental Protection Bureau
New York State Department of Law

Attention: Nancy Sterns, Esq.
Norman Spiegel, Esq.
Greg Shkuda, Ph.D.

October 25, 1983
<u>Revised</u>: April 1984

5 Central Avenue, West Orange, New Jersey 07052 (201) 325-0806

(2) Well or sample depth (when available); and

(3) Month sampled

Water quality data presented on Figure 6 ranges from non-detected concentrations to about 1,000,000 ppb. Many of the compounds were reported as present and were not quantified. Taking into account that the high concentrations may have been an analytical error, a contaminated ground water area south of the tank farm can nevertheless be delineated.

Number of Detected Compounds

A graphic representation of the most frequently detected organic compounds in ground water versus the type of compound found was constructed (Figure 7).

The reported detection for the monitoring wells were tabulated for all compounds detected in two or more samples and were placed on the graph. This graph represents the frequency of compounds detected in ground water samples regardless of their concentrations.

4.2 Geology

The geology of the region has been extensively studied, primarily because of the importance of ground water to Long Island. Glacial deposits, consisting of till and outwash sands and gravels of Pleistocene Age, mantle much of Long Island. In this area, they are found to a depth of about 100 feet below sea level and unconformably overlie the sediments of the Cretaceous Magothy Formation on an erosional surface. The Magothy Formation consists of silts, sands, gravels, and clays and is reported to be 800 to 1,200 feet thick in this area (Jacob, 1968; Anderson & Berkebile, 1976). The underlying Cretaceous sediments and bedrock are not considered here because they are found well below the depth of the fresh water aquifer and the contamination.

Descriptions of samples obtained during drilling for installation of monitoring wells in the vicinity of the Suffolk County Airport indicate that the glacial material is composed primarily of fine to coarse sand with some silt and gravel. Glacial material is often variable in lithology and depositional mode within relatively small areas. Local variations could affect ground water quality, in particular clay particles may adsorb organic compounds in percolating water. Variations in depositional mode, resulting in different bedding structures, could affect ground water flow paths. Detailed logs, continuous from the surface to the total depth of any monitoring well should be obtained whenever possible.

The constructed hydrogeologic profiles (Figures 4 and 5) display the depths of some of the wells and the lithologies encountered. Based on available information about the area, the lithology is described in the profiles as fine to coarse glacial sands and gravels.

4.3 Geohydrology

Geohydrologic conditions of the region are known based on numerous investigations (Nemickas, 1982; Berkebile, 1975; Holzmacher, McLendon and Murrel, 1968). Underneath Long Island fresh ground water occurs in a lenticular shaped deposit overlying salt water. The deposit is thickest toward the center of the island, thinning rapidly along the coasts. The fresh ground water near the Suffolk County Airport is usually under phreatic water table conditions. As a result, the elevation of the water table generally parallels the topography. The principal aquifers in the area are the upper Glacial aquifer and the deeper Magothy aquifer. These aquifers have hydraulic properties which are similar. For the purpose of this study, we are mainly concerned with the upper Glacial aquifer. The transmissivity of the upper Glacial aquifer ranges from about 45,000 to 75,000 gallons per day per foot (gpd/ft) (Nemickas, 1982). The horizontal hydraulic conductivity is on the average about 350 ft/day and the specific yield ranges from 0.20 to 0.30. The saturated thickness of the aquifer is about 50 feet.

The water level contour map, constructed from the March 1982 measurements in the NYDOT wells indicate that the water table in the study area generally slopes to the south and is affected by streams to the SE and SW (Figure 3). We have assumed that these measurements indicate "static" conditions because: (a) most private wells in the area have not been in use since 1977; (b) we do not have pumping records from the SCWA supply wells along Meetinghouse Road to indicate variations in the pumping rate from 3,000 gpm; and (c) water level measurements have not been obtained from the monitoring wells on a consistent basis to indicate water level changes with time. Based on the water table elevations from Figure 3, the hydraulic gradient is on the order of 1.5×10^{-3} ft/ft. The velocity of ground water flow in the glacial aquifer is computed from on Darcy's Law:

$$v = \frac{Ti}{dn} \qquad (1)$$

where: v = acutal velocity of ground water, ft/day

T = transmissivity = ranges from 6,000 to 10,000 ft^2/day

i = hydraulic gradient, ft/ft

d = saturated thickness of the aquifer, feet

n = porosity, assumed equal to specific yield

The computed groundwater velocity is therefore about 0.6 to 1.5 ft/day.

The depth to water in the vicinity of the tank farm is on the order of 30-36 feet. The NYDOT elevations are tied into an assumed elevation which was adjusted for the construction of the contour map (Figure 3). Most of the elevations of the few other wells in which water levels have been measured are not known. Water levels in private wells usually cannot be measured due to the inaccessibility of the wells. Without water level measurements tied into an elevation, and taken at regular intervals over a period of time, it is difficult to correlate water table fluctuations with precipitation, stream flow, artificial recharge, or variations in pumpage. Since many of the wells are only installed into the top of the water table, relatively large variations in the water table elevation may not be measurable. As stated earlier, we have assumed that the NYDOT well measurements reflect current conditions. We have also assumed that the water table elevation does not fluctuate more than an inch or two in response to factors mentioned above and its configuration remains relatively constant.

The available depths to water were indicated on the hydrogeologic profiles (Figures 4 and 5). Some surface elevations, which were not available from the files, were approximated from the contours on the regional topographic sheet. These profiles display the general topography with relationship to the depth to water. In addition, considering the fact that the aquifer extends to a depth between 50 and 100 feet below land surface, it is apparent from the hydrogeologic profiles that ground water sampling is not representative of the total aquifer depth. In most cases, only the top few feet of the aquifer were sampled.

4.4 Surface Water and Recharge

The area south of the airport is bounded by two streams (Aspatuck and Quantuck Creeks) that join to form Quantuck Bay to the south. The Quogue Wildlife Refuge ponds and streams, which are on the east side of the airport, drain south into Quantuck Creek. Aspatuck Creek also flows south on the western side of Peters Lane. Although no culvert is present under the railroad and road to the north of Aspatuck Creek, it was noted through our field observation that this area (which is adjacent to the tank farm) slopes toward the creek.

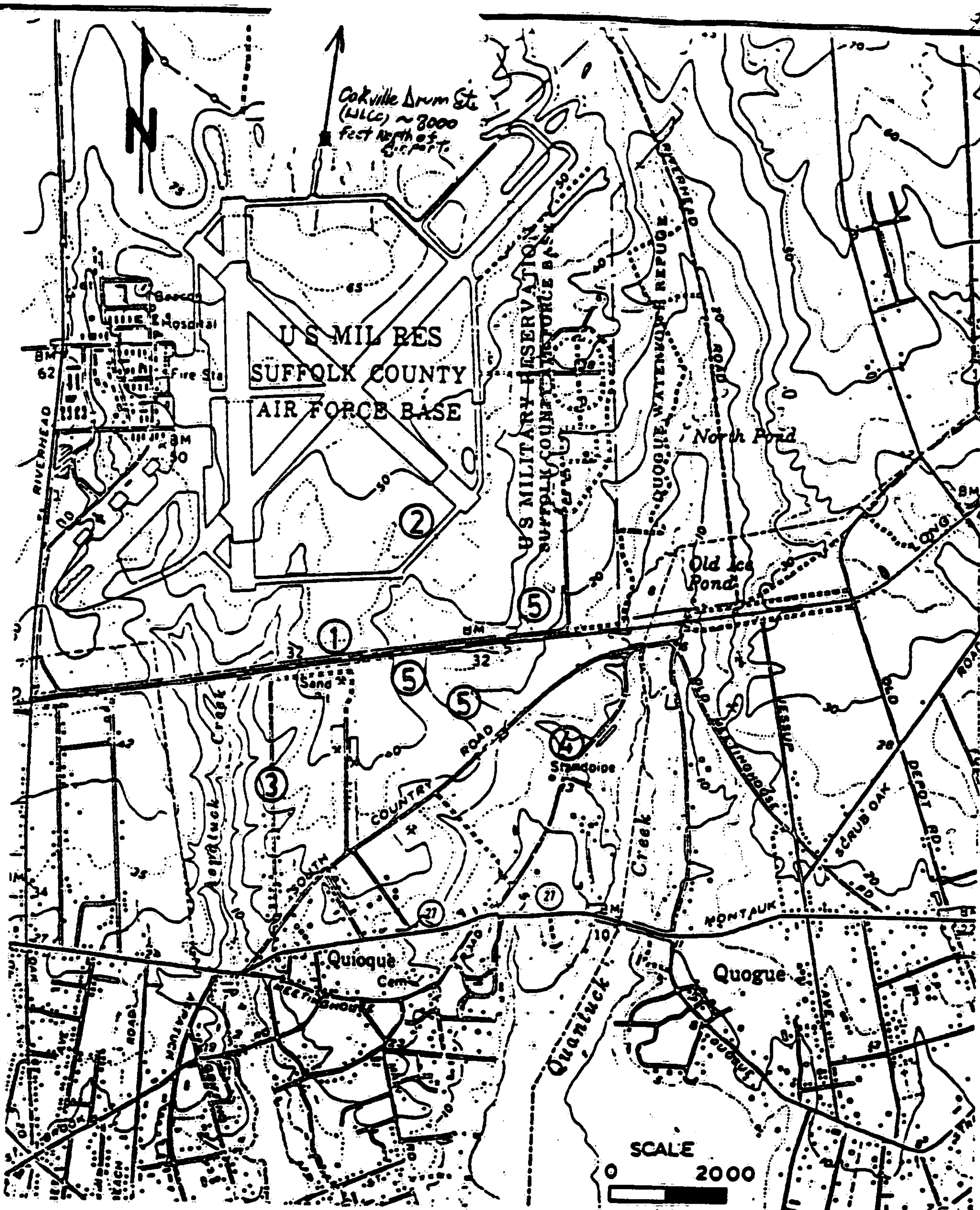
The average precipitation for the area is 43 inches per year, based on the 30-year precipitation records of the National Weather Service (Nemickas, 1982). The amount of overland runoff from precipitation is relatively low because the soil and subsurface are highly permeable. Much of the precipitation is infiltrated through the unsaturated zone to the water table. Therefore, the surface water consists mainly of ground water discharge.

The division between infiltration and runoff of a contaminant "slug" such as the 10,000 gallons of fuel spilled is dependent upon several factors including: precipitation amount and duration, land surface slope and the characteristics of the unsaturated material above the water table. It is generally assumed that the soils and glacial sands allow for rapid infiltration and recharge. However, based on local drainage, a spill of such magnitude could in part reach surface water bodies.

4.5 Water Quality

4.5.1 Ground Water

The water quality of the glacial aquifer in the area has generally been found to be potable in most parts. Iron, chloride and nitrate often occur in concentrations higher than drinking water standards of background concentrations. Concentrations of iron in the majority of water samples (March 1983) taken from the wells installed adjacent to the Quogue Wildlife Refuge were found to be above the New York State limits for drinking water (0.3 mg/l). The remaining parameters tested were within the drinking water standards. No volatile organics were detected in the surface water of the Wildlife Refuge. Other studies of the glacial aquifer ground water have found the water to be of good quality (Nemickas and Koszalka, 1982).



APPROXIMATE
LOCATION OF:

1. TANK FARM
2. FIRE PIT
3. PETERS LANE
4. SCWA WELL FIELD
5. LANDFILL

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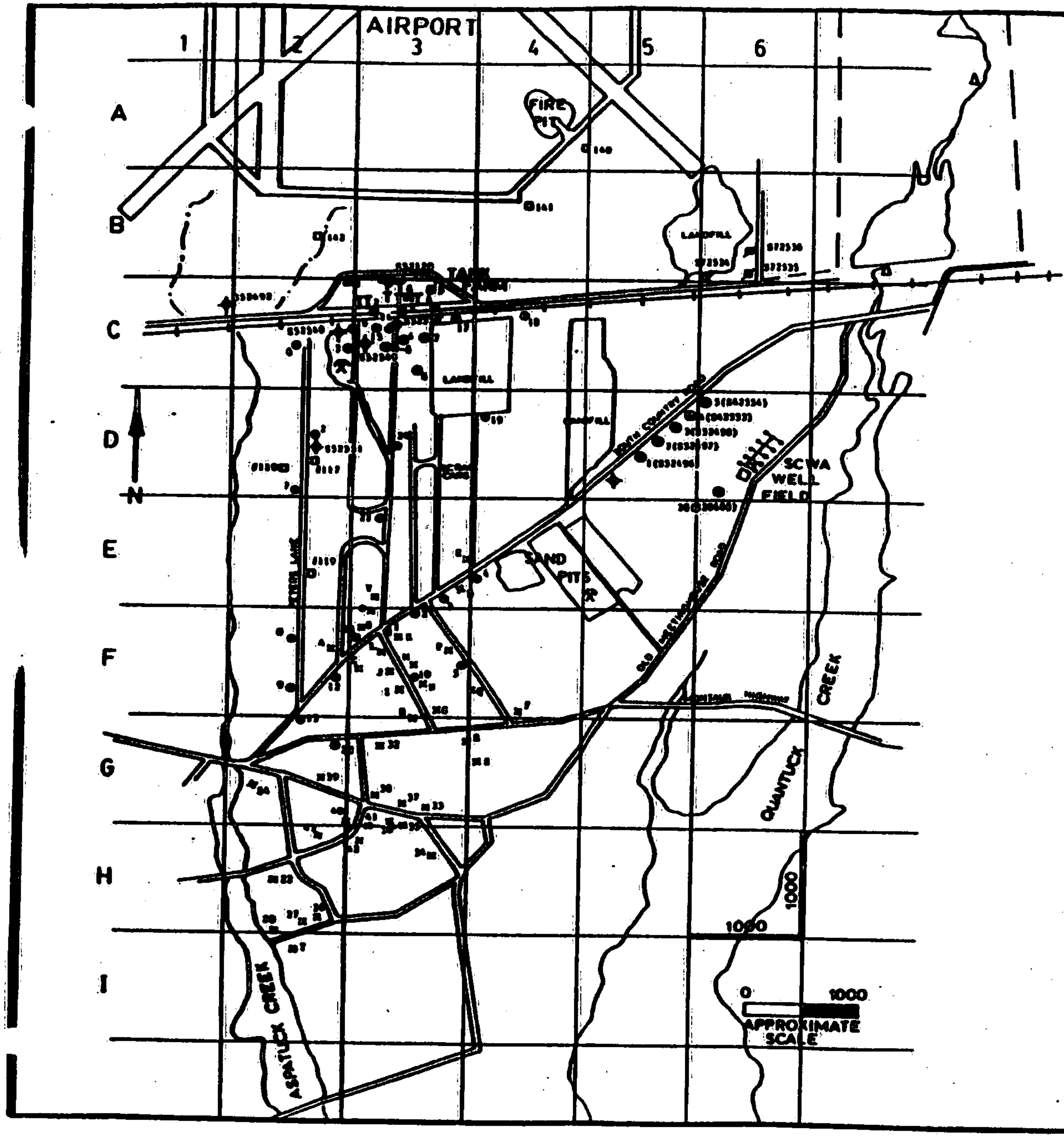
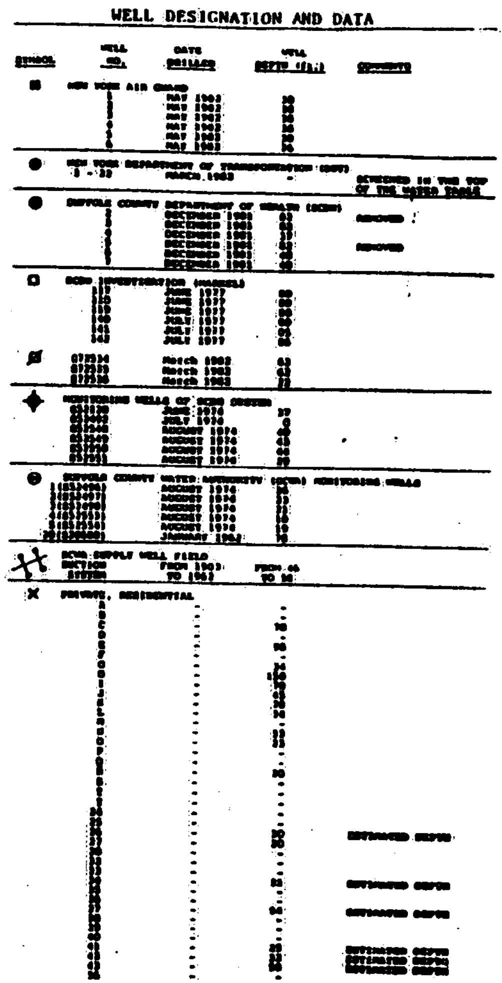
SUFFOLK COUNTY AIRPORT
PROJECT LOCATION MAP

NEW YORK DEPARTMENT OF LAW
ENVIRONMENTAL PROTECTION BUREAU

Prepared By JMH	Date AUG./SEPT. 1983
Job No. 83C146	Figure No. 1





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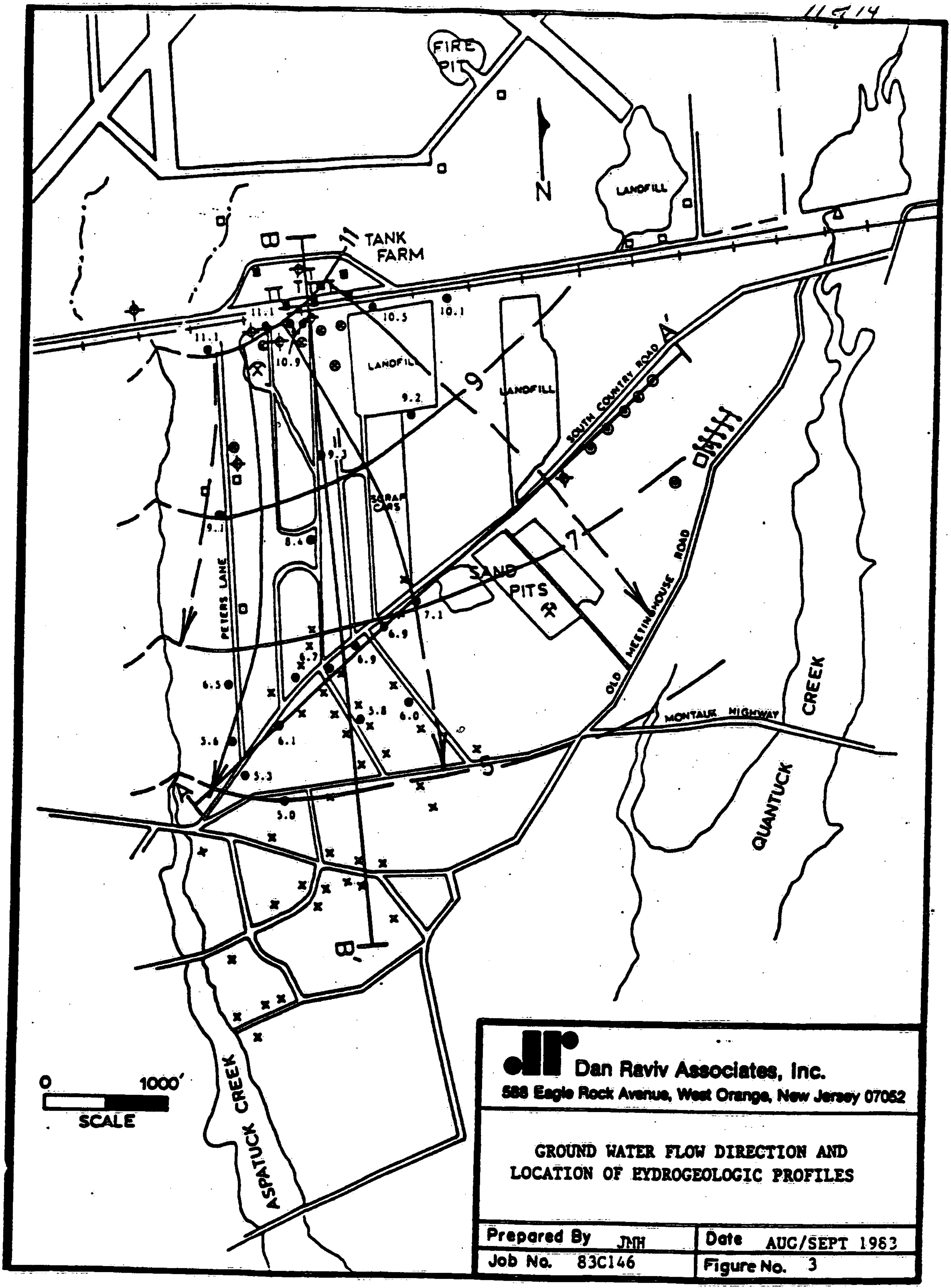
WELL LOCATION, OWNERSHIP, DESIGNATION AND INFORMATION

SUFFOLK COUNTY AIRPORT - NYSDOT

Prepared By JMH	Date AUG/SEPT 1983
Job No. 83C146	Figure No. 2

10 of 14



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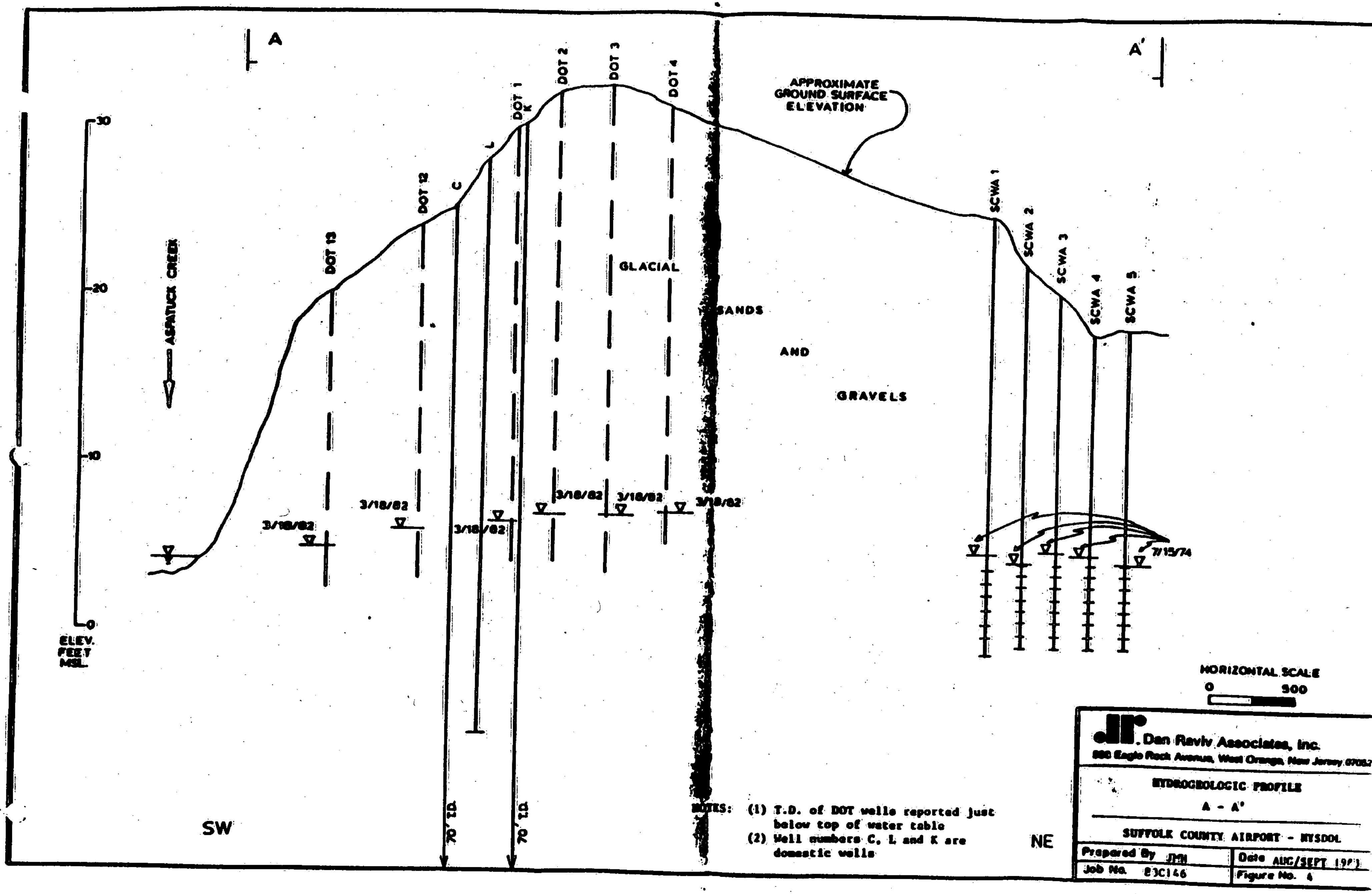
GROUND WATER FLOW DIRECTION AND LOCATION OF HYDROGEOLOGIC PROFILES

Prepared By JMH	Date AUG/SEPT 1983
Job No. 83C146	Figure No. 3

Figure No. 3 cont'd

EXPLANATION

SYMBOL	DESCRIPTION
●	NEW YORK DEPARTMENT OF TRANSPORTATION WELL Sampled 3/82
×	PRIVATE, RESIDENTIAL WELL Sampled 2-3/82
⊗	SUFFOLK COUNTY DEPARTMENT OF HEALTH (SCDH) WELL Sampled 12/81 & 3/82
◎	SUFFOLK COUNTY WATER AUTHORITY(SCWA) MONITORING WELL Sampled 12/81 & 1/82
	SCWA PUBLIC SUPPLY WELLS
■	NEW YORK AIR GUARD WELL Sampled 5/82
△	QUOGUE WILDLIFE REFUGE WELL OR SURFACE WATER SAMPLE POINT Sampled 3/83
⌖	"S" MONITORING WELL OF SCDH SYSTEM
□	SCDH INVESTIGATION WELL (no sample data since 1977)



A
A'
DOT 2
DOT 3
DOT 4
DOT 1
K
L
C
DOT 12
DOT 13
APPROXIMATE GROUND SURFACE ELEVATION
ASPATUCK CREEK
GLACIAL
SANDS
AND
GRAVELS
SCWA 1
SCWA 2
SCWA 3
SCWA 4
SCWA 5
30
20
10
0
ELEV. FEET MSL
3/18/82
7/15/74
70' T.D.
SW
NE
HORIZONTAL SCALE
0
500
NOTES: (1) T.D. of DOT wells reported just below top of water table
(2) Well numbers C, L and K are domestic wells
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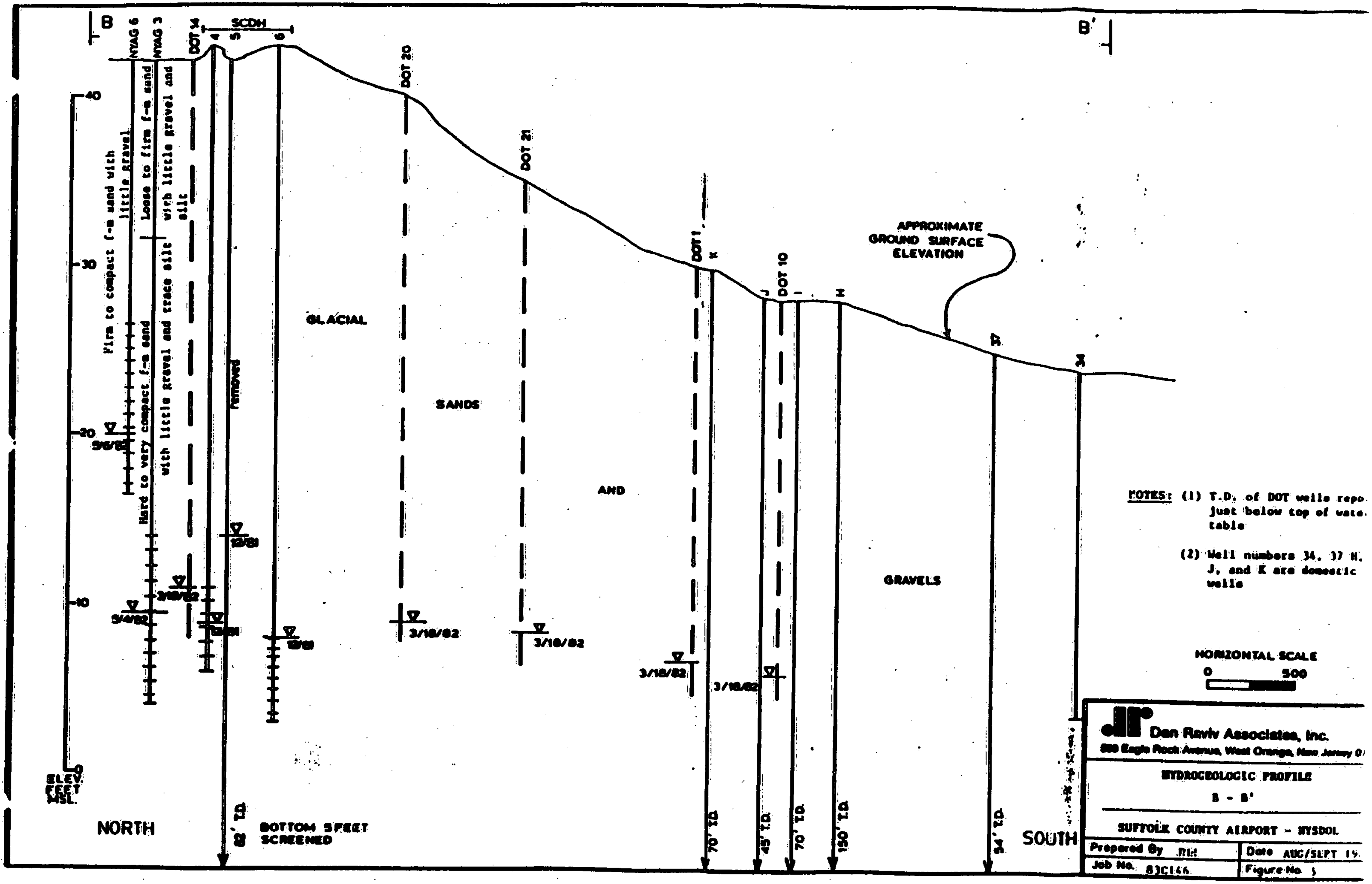
HYDROGEOLOGIC PROFILE
A - A'
SUFFOLK COUNTY AIRPORT - NYSDOL
Prepared By JMH
Date AUG/SEPT 19
Job No. 83C146
Figure No. 4



B
B'
NYAG 6
NYAG 3
DOT 14
SCDH
4
5
6
DOT 20
DOT 21
DOT 1
K
DOT 10
J
I
H
37
34
40
30
20
10
0
ELEV. FEET MSL.
Firm to compact f-m sand with little gravel
Loose to firm f-m sand with little gravel and silt
Hard to very compact f-m sand with little gravel and trace silt
removed
GLACIAL
SANDS
AND
GRAVELS
APPROXIMATE GROUND SURFACE ELEVATION
5/6/82
5/4/82
3/18/82
12/81
3/18/82
3/18/82
3/18/82
3/18/82
82' T.D.
BOTTOM 5 FEET SCREENED
70' T.D.
45' T.D.
70' T.D.
150' T.D.
54' T.D.
NORTH
SOUTH
NOTES: (1) T.D. of DOT wells repo... just below top of wate... table
(2) Well numbers 34, 37 H, J, and K are domestic wells
HORIZONTAL SCALE
0
500
Dan Raviv Associates, Inc.
HYDROGEOLOGIC PROFILE
B - B'
SUFFOLK COUNTY AIRPORT - NYSDOL
Prepared By
Date AUG/SEPT 19..
Job No. 83C146
Figure No.

Appendix 1.3-4
1 of 3

M UNITS

} QUATERNARY

} TERTIARY(?)

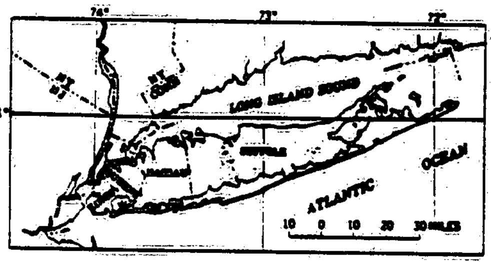
OF P UNITS

LT RSH DEPOSITS
L. DIFFERENTIATED
MORAINE
AL RAINE
D M AINE
AL MORAINE
ND ERENTIATED
FEI TIATED

INTRODUCTION

WATER NEEDS OF SUFFOLK COUNTY

Water pumped from aquifers underlying Suffolk County (index map) is the sole source of water used for public supply, agriculture, and industry. The county's population grew from less than 200,000 in 1940 to 1.1 million in 1970. Most of the growth occurred after 1950. Ground-water pumpage increased from 40 mgd (million gallons per day) in 1950 to 155 mgd in 1970 (New York State Department of Environmental Conservation, written commun., June 1, 1971). The projected ground-water use for an anticipated population of 2 million in the county by 1990 is 300 mgd (New York State Conservation Department, 1970, p. 26–27).



INDEX MAP SHOWING LOCATION (SHADED) OF SUFFOLK COUNTY

PURPOSE AND SCOPE

The large and growing demand for ground water in Suffolk County has created a need for a detailed knowledge of the geometry and the hydrologic characteristics of the ground-water reservoir. Mapping of subsurface geology and hydraulic heads in the aquifers are important prerequisites to obtaining this information. Maps of the subsurface geologic units of Long Island were first shown in a report by Suter and others (1949, pls. VIII to XXI). But those maps were highly generalized, because there were few data on deep borings and wells in the county when the report was prepared. Since 1949, additional data from many deep borings and wells in the county have been collected.

In 1968, as part of a continuing cooperative program of water-resources studies with the Suffolk County Water Authority and Suffolk County Department of Environmental Control, the U.S. Geological Survey began an updating of the hydrogeologic and hydrologic maps of all the county. The basic data in Jensen and Soren (1971), the first product of the program, are the basis for the hydrologic maps in this report.

ACKNOWLEDGMENTS

The authors appreciate the cooperation of well-drilling companies, their employees, and the many officials of public and private water companies who furnished geologic and hydrologic data for use in this report.

GEOLOGIC AND HYDROGEOLOGIC UNITS

Pleistocene glacial drift generally mantles the county's surface. Pleistocene deposits overlie unconsolidated deposits of Late Cretaceous age. The Cretaceous strata lie on a peneplain that was developed on Precambrian(?) crystalline rocks.

Major landforms include ridges, valleys, and plains. These landforms are roughly oriented in belts parallel to the county's length. The northern and the central parts are traversed by irregular sandy and gravelly ridges of terminal moraine. The crest of the northern ridge ranges in height from 100 to 300 feet above sea level and the crest of the central ridge from 150 to 400 feet. The highest altitudes in the inter-ridge area range from 100 to 200 feet. Irregular plains and rolling hills, formed from sandy and gravelly ground moraine and outwash deposits of sand and gravel lie in the area between the ridges. An outwash plain slopes at a near-uniform gradient from the southern base of the central ridge, which is about 100 feet above sea level, southward to Great South Bay and the ocean. Along the north shore, steep bluffs as high as 100 feet and generally narrow sandy and gravelly beaches face Long Island Sound. The barrier-bar system at the southernmost side of the county is composed of sandy beach and dune deposits. The highest altitudes of the barrier bars generally range from 10 to 45 feet.

The ground-water reservoir system of Suffolk County is composed of hydrogeologic units that include lenses and layers of clay, silt, clayey and silty sand, sand, and gravel. A hydrogeologic unit consists of a geologic unit or a group of contiguous geologic units classified by hydraulic characteristics. These units include aquifers, which are principal water sources, and confining layers, which separate the aquifers. The aquifers are, from the land surface downward, the upper glacial aquifer, the Magothy aquifer, and the Lloyd aquifer. The major areal confining layers are, in descending order, the Gardiners Clay, the Monmouth greensand, and the Raritan clay. The base of the ground-water reservoir is the crystalline bedrock. Characteristics of the geologic and the hydrogeologic units are summarized in the table, and the following data of hydrologic significance are shown on the maps: base of ground-water reservoir, altitudes of aquifers, altitudes and limits of confining layers, and distribution of surficial deposits. The hydrogeologic sections show the vertical relations of the units to each other.

The sharp angular shapes of some of the contours reflect the fact that in places the contours are drawn on stratigraphic tops of the hydrogeologic units and in places the contours are drawn on erosional surfaces. The sharp angles result from the juncture of a stratigraphic top and an eroded surface.

2 of 3

GROUND-WATER SYSTEM

RECHARGE AND DISCHARGE OF FRESH GROUND WATER

Precipitation is the sole source of fresh-water recharge in the county. Average annual precipitation is about 45 inches; it generally ranges from 40 inches at the eastern end of the county to 50 inches in the middle and is nearly evenly distributed over the year (Miller and Frederick, 1969, plate 1). About half the precipitation seeps into the ground and percolates downward to the water table to become ground water; nearly half the precipitation is returned to the atmosphere by evaporation and plant transpiration; and a small amount of the precipitation, about 5 percent, enters streams by direct runoff (Cohen and others, 1968, p. 36–40, and Cohen and others, 1970, p. 11 and 14).

Ground water moves to discharge seaward mainly by subsurface outflow to salty ground water that is hydraulically connected with the sea and by seepage into streams that discharge into tidewater.

More than 50 streams discharge fresh water into the bordering bays, Long Island Sound, and the ocean. Most of the surface divide for the streams that drain the county lies in the northern half and extends from Melville, on the west, eastward through the Centereach area to the vicinity of the Brookhaven National Laboratory. From the area of the Brookhaven National Laboratory, the divide bifurcates into branches that approximately traverse the central lengths of the county's north and south forks. Streams flow to tidewater north and south of the divides, except for the Peconic River, which flows eastward to tidewater from the branching of the divides.

The total annual streamflow discharging into tidewater from about 1945 to 1971 averaged 390 cfs (cubic feet per second), or 253 mgd, distributed as follows (D.E. Vaupel, written commun., January 1969, and A.G. Spinello, oral commun., August 1971): most of the discharge, 280 cfs, from the southern part of the county into Great South Bay and, to a lesser extent, into the ocean; 60 cfs into Peconic Bay and other bays, between the north and south forks; and 50 cfs from the northern part of the county into Long Island Sound. Ground-water seepage constitutes about 95 percent of stream outflow.

MAN-MADE CONDITIONS

The effects of man's development on the ground water of Suffolk County has primarily been the diversion of part of it by wells and a return of the used, and generally chemically altered, ground water to the soil and ground-water reservoir. Used ground water is currently returned to the ground-water reservoir principally through cesspools. Some waste water from industrial processes returns to the ground through seepage pits; and ground water pumped for air conditioning and industrial cooling is returned, with higher temperatures, through recharge wells to the ground-water reservoir. Ground water pumped for crop irrigation and lawn sprinkling mostly represents a net loss from the system by evapotranspiration. Artificial filling of marshy shore areas has probably reduced evapotranspiration.

In 1970, gross ground-water pumpage in Suffolk County was 155 mgd (New York State Department of Environmental Conservation, written commun., June 1, 1971). An unknown amount of the pumpage was consumed by evapotranspiration, and virtually all the remainder (probably more than 75 percent) was returned to the ground through local waste-disposal facilities.

MOVEMENT OF GROUND WATER

Ground water moves from three major drainage subareas toward discharge at or near the shore. These subareas are (1) the main land area of the county from the Nassau County boundary to a point near the Brookhaven National Laboratory, (2) the north fork, from the Brookhaven National Laboratory to Orient Point, and (3) the south fork, from the Brookhaven National Laboratory to Montauk Point. The ground-water divides of these subareas form a "Y"-shaped pattern that approximately coincides with the major surface-water drainage divides. The arms of the Y radiate from the general area of the Brookhaven National Laboratory through the centers of the north and the south forks. Ground water moves northward toward Long Island Sound and southward toward Great South Bay and the ocean; lesser amounts in the Brookhaven National Laboratory and Riverhead areas percolate eastward toward Peconic Bay. Ground-water drainage from the north-fork area moves northward to Long Island Sound and southward into Peconic and Gardiners Bays and Block Island Sound; in the southfork area, ground water moves northward to Peconic and Gardiners Bays and Block Island Sound and southward into

QUALITY OF THE GROUND WATER

The concentrations of chemical constituents in the ground water in most of Suffolk County are generally below the recommended maximum limits of the U.S. Public Health Service (1962, p. 7). However, some local water-quality problems exist, both natural and man-made.

ACIDITY

The pH of ground water ranges from 5.5 to 7.2 but is generally less than 7.0. The water commonly is sufficiently acidic to be corrosive. The Public Health Service has set no standards on acidity of drinking water other than that it should not be excessively corrosive to the supply system (1962, p. 7). Accordingly, water from many public-supply systems is treated with alkaline compounds to reduce acidity before distribution.

DISSOLVED IRON

According to the U.S. Public Health Service (1962, p. 7), dissolved iron concentrations in drinking and culinary water should not exceed 0.3 mg/l (milligram per liter). Excessive iron impairs the taste of water and of food and beverages prepared with the water; it also stains laundry and stains and clogs plumbing fixtures. High iron concentrations, locally more than 1 mg/l, are common in water from the Magothy and the Lloyd aquifers. As a result, many public-water suppliers remove excessive iron.

CHLORIDE

Along the seaward margins of the county, the fresh ground water is underlain and bordered by salty ground water that is hydraulically connected to the ocean, the bays, or Long Island Sound. Zones of mixed water, called zones of diffusion, separate the fresh and the salty ground water. The thickness of these zones probably ranges from a few feet in the upper glacial aquifer to as much as 500 feet in the Magothy aquifer (Luszczynski and Swarzenski, 1966, p. 23). The chloride content of the ground water in the zone of diffusion ranges from less than 10 mg/l to that of sea water—about 18,000 mg/l.

Contamination of the fresh ground water with salty ground water associated with the upward and landward movement of the zones of diffusion has not resulted in the abandonment of many wells in Suffolk County. However, the long-term potential threat of increased contamination of this type is of concern to numerous agencies and individuals in the county. A detailed discussion of this potential problem is beyond the scope of this report; however, considerable insight to the problem can be obtained from reports by Crandell (1962, p. 17–19, and 1963, p. G28–G31), Perlmutter and DeLuca (1963, p. B31–B34), Luszczynski and Swarzenski (1966, p. F66–F69), Holzmacher, McLendon, and Murrell (1970, p. 247–271), Collins and Gelhar (1970, p. 144–150), and Soren (1971b, p. A31–A34).

DETERGENT CONSTITUENTS (MBAS)

More than 95 percent of the ground water used for domestic supply in Suffolk County is returned to the ground through cesspools, septic tanks, and similar structures. As a result, the ground water and the ground-water-fed streams locally contain measurable amounts of certain substances of sewage origin, including foaming agents derived from synthetic detergents, commonly referred to as MBAS or methylene blue active substance. MBAS has been noted mainly in water from the upper glacial aquifer (Perlmutter and Guerrera, 1970, p. B14) and in the streams (Cohen, Vaupel, and McClymonds, 1971). Apparently, little or no MBAS had been found in water in the Magothy and the Lloyd aquifers. Where MBAS has been found in the water, the content is commonly less than 0.5 mg/l, the maximum limit in public-supply water recommended by the U.S. Public Health Service (1962, p. 24). However, locally, as much as 5 mg/l has been found in the ground water; and in some areas the MBAS content of the water seems to be increasing. As a result, the Suffolk County Legislature recently (1971) passed a law banning the sale of certain detergents in the county. In addition, plans have been developed for the construction of widespread sanitary-sewer systems that will discharge treated waste water into the sea.

NITRATE

The amount of nitrate in the ground water of Suffolk County is of concern of water managers and health officials. According to the U.S. Public Health Service (1962, p. 7) more than 45 mg/l nitrate (10 mg/l NO_3-N) in water supplies may be harmful, especially to infants. Perlmutter and Koch (1972, p. B230) estimated that the average natural background level of nitrate in ground water of Nassau and Suffolk more rapid horizontally than vertically. This partly reflects the low vertical hydraulic conductivity of the near-horizontal interbedded clay and silt lenses and beds. The estimated average rates of horizontal movement in the upper glacial, the Magothy, and the Lloyd aquifers are 0.5, 0.2, and 0.1 foot per day, respectively, in areas remote from pumping wells, and hundreds of feet per day near the screens of pumping wells (Soren, 1971a, p. 16). Vertical rates of movement are described in the following section.

HYDRAULIC INTERCONNECTION OF AQUIFERS

The aquifers of Long Island are hydraulically interconnected. Layers of clay and silt within an aquifer, or clayey and silty units between aquifers, confine the ground water; but these units do not completely prevent the vertical movement of water through them.

On the average, the vertical hydraulic conductivity of and rates of vertical flow through the upper glacial aquifer are greater than those of all other hydrogeologic units in Suffolk County. The vertical movement of water through the Magothy aquifer is impeded by intercalated lenses and beds of clay and silt; but, locally, vertical movement through the aquifer is facilitated by the lateral discontinuity of clay and silt beds. Vertical movement of water through clay and silt beds of the Magothy aquifer is very slow. The Raritan clay effectively confines water in the underlying Lloyd aquifer because the Raritan clay is thick, is areally persistent, and is of very low hydraulic conductivity. Movement through the bedrock is negligible.

The contact between the upper glacial and the Magothy aquifers is not a smooth plane. Glacial deposits fill buried valleys that were cut in the Magothy aquifer, and these deposits are in lateral contact with truncated beds in the Magothy aquifer. In the buried valleys, water enters the Magothy aquifer at depths of hundreds of feet directly from the upper glacial aquifer. Near Huntington, a buried valley cuts completely through the Magothy aquifer and extends into the Raritan clay; in the Ronkonkoma basin, the Magothy aquifer seems to be nearly completely cut through; and along the north shore, where locally all the pre-Pleistocene deposits were completely eroded, the upper glacial aquifer is in contact with the full thickness of the Magothy aquifer. (See map showing altitude of top of Magothy aquifer and hydrogeologic sections, sheet 1.)

Where the upper glacial aquifer lies directly on sandy beds of the Magothy aquifer, good vertical hydraulic continuity exists between the two aquifers. Head losses between the water table in the upper glacial aquifer and the base of the Magothy aquifer in the area of the main ground-water divide in western Suffolk County (a vertical distance of as much as 900 feet) in 1968 generally were less than 2 feet (Soren, 1971a, p. 17–19). Furthermore, in areas of Long Island where ground-water withdrawals from both the upper glacial and the Magothy aquifers are large, the cones of depression in their water-level surfaces caused by pumping are similar in areal extent and configuration (Soren, 1971b, p. 15; and Kimmel, 1971, p. B227–B228). These observations confirm the high degree of hydraulic continuity between the two aquifers in many parts of the county.

In the south shore area, the Gardiners Clay and the Monmouth greensand effectively confine water in the Magothy aquifer; and the high degree of confinement helps to prevent the downward movement of salty ground water into the Magothy aquifer. Wells that tap the Magothy aquifer on the barrier bars yield fresh water and commonly flow at land surface.

Recharge to the Lloyd aquifer results from downward movement of water from the Magothy aquifer and from the upper glacial aquifer through the Raritan clay. The main recharge area of the Lloyd aquifer seems to be in the Ronkonkoma area. Head losses across a thickness of 150 to 180 feet of Raritan clay in the county generally ranged from 6 to 42 feet in 1968 (Soren, 1971a, p. 17).

GROUND-WATER LEVELS

THE WATER TABLE

The water table on Long Island was first mapped in 1903 (Veatch and others, 1906, pl. 12). At that time its highest point in Suffolk County was 100 feet above sea level, near Melville on the main ground-water divide near the Nassau County border, and was 70 feet above sea level at another high point on the divide in the Lake Ronkonkoma-Selden area. Subsequent maps show that water-table altitudes have continued to be highest in these two areas but had declined to 80 and 65 feet respectively in both 1943 and 1951 (Jacob, 1945, pl. 1; and Luszczynski and Johnson, 1951, pls. 1–2); recovered to 90 and 70 feet by 1958 (Lubke, 1964, pl. 5); and had reached new lows of 70 and 65 feet by 1968 (Soren, 1971a, p. 20). This latest significant decline probably resulted mainly from a regional drought from 1962 to 1966 (Cohen, Franke, and McClymonds, 1969, p. 1).

The water-table map shows the altitude of the water table in early 1971. At that time, in the Melville area it was about 5 feet higher than in 1968, and in the Lake Ronkonkoma-Selden area it was about 5 feet lower. The water table still has not recovered from the apparent effects of the 1962–66 drought in areas of significant pumping, partly because of increased net withdrawals since 1966.

... wells in Kings County (G.E. Kimmel, written commun., August 1971), Queens County (Soren, 1971b, p. A30–A31), Nassau County (Perlmutter and Koch, 1972), and Suffolk County (Harr, 1971) yield water containing more than 0.2 mg/l NO_3-N. Moreover, at least 50 wells on Long Island yield water containing more than 10 mg/l NO_3-N.

3 of 3

The amount of water having more than 0.2 mg/l NO_3-N, its rate of increase, and the depth at which it is found seem to increase westward on Long Island as a whole, as well as in Suffolk County. These relations probably largely reflect the westward increase in population density, the westward increase in the age of the communities, and the associated degree of contamination of the ground water related to man's activities.

In Suffolk County, the two major sources of nitrate nitrogen in the ground water are (1) disposal of waste water into the ground and (2) agricultural activities, especially those involving the use of fertilizers. A planned countywide sanitary-sewer system is intended to reduce sewage as a source of nitrate nitrogen in the ground water of Suffolk County.

GROUND-WATER PUMPAGE

Pumpage from Suffolk County's aquifers increased from about 40 mgd in 1950 to about 155 mgd in 1970, to supply a population that has been increasing rapidly since the end of World War II. The greatest increases in population and ground-water pumpage have been in the western part of the county. Before about 1960, wells tapping the upper glacial aquifer supplied nearly all the water used in Suffolk County. Since then, pumpage from the Magothy aquifer has increased, and in 1970, the wells tapping the Magothy aquifer supplied about one-third the water used. (See map showing areal distribution of major pumpage by aquifer 1970.)

Lloy aqui

Magoth aquifer

CHANGES OF GROUND WATER IN STORAGE

An area of about 140 square miles in west-central Suffolk County is underlain by about 4.5 trillion gallons of fresh water (Soren, 1971a, p. 20). By extrapolation, the total fresh ground water beneath all the county is probably 4 to 5 times this volume.

Withdrawals of ground water have caused the water table in some parts of the county to decline as much as 25 feet from earliest known levels in 1903 (map showing net change in the position of the water table) and have probably caused a small regional but generally undetected landward advance of salty ground water. The decline of the water table reflects a loss of 60 to 80 billion gallons of fresh water from the ground-water reservoir between 1903 and 1971. However, this loss of ground water from storage is less than 1 percent of the total ground water in storage in Suffolk County.

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Appendix 1.3-5
1 of 7

Hydrology of Brookhaven National Laboratory and Vicinity Suffolk County, New York

By M. A. WARREN, WALLACE DE LAGUNA and N. J. LUSCZYNSKI

STUDIES OF SITES FOR NUCLEAR ENERGY FACILITIES—
BROOKHAVEN NATIONAL LABORATORY

GEOLOGICAL SURVEY BULLETIN 1156-C

This report concerns work done on behalf of the U.S. Atomic Energy Commission

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STUDIES OF SITES FOR NUCLEAR ENERGY FACILITIES—BROOKHAVEN NATIONAL LABORATORY

HYDROLOGY OF BROOKHAVEN NATIONAL LABORATORY AND VICINITY, SUFFOLK COUNTY, NEW YORK

By M. A. Warren, Wallace de Laguna, and N. J. Lusczynski

ABSTRACT

The Brookhaven Natonal Laboratory is in central Suffolk County, Long Island, New York. The area studied surrounds and includes the Laboratory and is referred to herein as the Upton area. It extends across the island in a band about 18 miles wide from the Atlantic Ocean to Long Island Sound between longitudes 72°45' and 73°00'. Its climate is characterized by mild winters and relatively cool summers. Precipitation averages about 45 inches a year evenly distributed throughout the year. The soil and the immediately underlying sediments are generally sandy and highly permeable. Water penetrates them readily and except in periods of intense precipitation there is very little direct overland runoff to streams.

Permeable Pleistocene deposits, 100–200 feet thick, constitute the uppermost aquifer. It receives recharge from precipitation (the only source of fresh water on the island) and discharges mainly into streams, the ocean, and the sound and to a some lesser extent into lower aquifers. The lower aquifers, several hundred feet in total thickness, transmit water under artesian pressure from the high central part of the island toward its edges where it is discharged into streams or into bodies of salt water. Streamflow is supported throughout the year very largely by ground-water discharge.

Within this broad pattern the details of the movement and behavior of water are determined by the geology, the topography, and the seasonal and local distribution of precipitation. Tests at the Laboratory site indicated that under favorable conditions water may move from the land surface to the water table at a rate of about 30 feet per day. Under less favorable conditions it may move 1 foot a day or less.

The topography of the water table conforms only generally to that of the land surface. Ground-water divides between the small streams in the area differ significantly from topographic divides and explain apparent differences in the rates of discharge per square mile. At the Laboratory site most of the ground-water movement is southward toward the Atlantic Ocean, but part of it is eastward to Peconic Bay. Ground-water movement in a part of the Laboratory area is either to the south or to the east, depending upon the stage of the water table, and is controlled by the presence of relatively impermeable beds near the surface.

5 to 10 feet above mean high tide. Long Island was also visited by two hurricanes in 1954. Unconfined ground water in low-lying areas near the shore is salted by sea water blown inland during hurricanes.

The maximum depth of freezing in the soil zone is 15 inches; the average is much less. Because the soil is not frozen during most of the winter season, recharge to the water table is possible during the winter, and because evapotranspiration is low, most of the ground-water recharge does, in fact, take place during the colder months, from December to May.

PRECIPITATION

Precipitation, the only source of fresh water for the streams and ground water in the Upton area, is used here as the starting point of the hydrologic cycle. The average precipitation ranges from about 42 inches in the western part to about 46 inches in the eastern part of Long Island. In an average year, about 120 days have 0.01 inch or more of precipitation. Long Island is supplied with moisture from the Gulf of Mexico and from the Atlantic Ocean through the action of winds of cyclonic storms. The general current of the prevailing westerlies plays only a small part in producing precipitation in Long Island. Natural variations in precipitation are largely due to physiographic and storm-pattern factors.

The Upton area of Long Island has little relief and thus monthly, and especially yearly, precipitation does not differ much from one locality to another within the area. Such differences as do occur are due largely to local summer storms or to differences in the local details of the rain gage or its exposure. But, though geographic variations are not large, a careful study of cumulative records shows some variation in rainfall within the Upton area.

RECORDS AVAILABLE

Precipitation records for eight stations within a 13-mile radius of the center of the Brookhaven National Laboratory are used in this report. Three of these stations are on the Laboratory grounds; no two stations are more than 20 miles apart (fig. 1). The length of record at the end of 1953 ranges from 5 complete years (at two gages within the Laboratory area) to nearly 69 complete years at Setauket (tables 1 and 2). The earliest records are for 1864–82 at the village of Brookhaven. The record at Setauket began in 1885.

The rainfall records and the values for average, minimum, and maximum precipitation proved satisfactory for correlating precipitation with surface-water stages and flows and with ground-water levels. Precipitation data for periods of less than a month are discussed briefly, because they have some bearing on the problems of ground-water contamination (de Laguna, 1960).

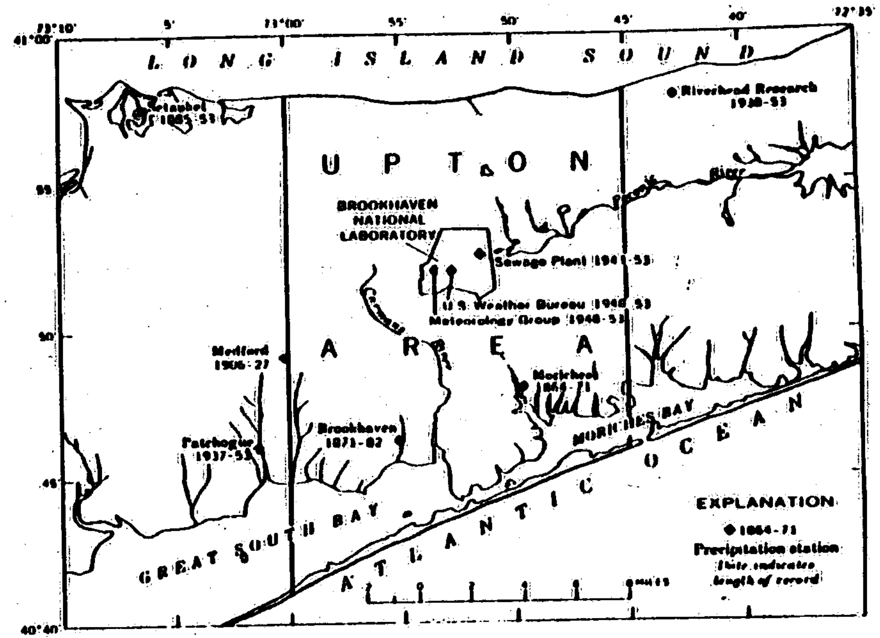


FIGURE 1.—Location of study area and precipitation stations.

The precipitation data for the 1864–71 period, listed for the village of Brookhaven, were actually collected at Moriches about 5 miles to the east. From 1871 to 1882 the data were collected at the village of Brookhaven, about 7 miles south of the present Laboratory area. This record, started under the sponsorship of the Smithsonian Institute (tables 1 and 2) before the establishment of the U.S. Weather Bureau, show that the average annual precipitation from 1864 to 1882 was 46.20 inches. This precipitation record includes the maximum and minimum yearly rainfalls for the Upton area, a high of 71.38 inches in 1869 (a year of a hurricane) and a low of 27.65 inches in 1881. The 2-year average for 1868–69 was 65.51 inches; the 3-year average for 1867–69 was 62.05 inches; and the 5-year average from 1865–69 was 59.61. These are all records and are considerably in excess of any recent data.

These data, especially those for 1865–69, are accepted with some reservation because they are much greater than those recorded at other stations along the northeastern seaboard. For example, precipitation in the city of New York, about 57 miles to the west, averaged 48.45 inches during this period, or about 11.16 inches less than that at Brookhaven. The present-day average at New York City is only 2–4 inches less than that for the Brookhaven area. Furthermore, the average precipitation reported for 1865–69 at Brookhaven was 0.35 inch higher

The average annual infiltration plus overland runoff for the 12 years was 22.59 inches. This value may also be computed from the average mean monthly temperatures and average precipitation for each of the calendar months, from which one may calculate average monthly evapotranspiration. From these 12 monthly averages, an average yearly rate of infiltration plus overland runoff of 22.06 inches may be calculated; it is 0.53 inch less than the average annual value found by computing by individual months (table 5), a difference of less than 5 percent.

SUMMARY OF COMPUTED RECHARGE

During the 12 water years from October 1941 to September 1953, the precipitation averaged 43.64 inches, evapotranspiration averaged 21–22 inches, and the residual (mostly recharge to ground water) averaged about 22 inches. During this period, the residual varied appreciably from month to month and from year to year. It was over 7 inches on 3 different months and was zero for about 2–3 months in an average year. The annual rate of infiltration (plus overland runoff) was as much as 31.99 inches in 1951–52, 29.33 inches in 1947–48, 26.93 inches in 1952–53, and as little as 11.70 inches in 1946–47.

Over a 50- to 100-year period, precipitation in the Upton area varies from a minimum of perhaps less than 30 inches per year to a maximum of perhaps more than 60 inches per year. The average annual evapotranspiration, over a similar period, will range from a minimum of 15 inches per year where the soil is very sandy to a maximum of 30 inches per year, and perhaps more, in swampy areas. Replenishment to ground water in the Upton area may, therefore, be as low as 10 inches in some areas in dry years and as much as 35 inches in other areas in wet years. Locally, recharge to ground water may even vary from practically nothing in some swampy localities, when precipitation is extremely low, to as much as 45 inches in sandy localities, when precipitation is extremely high.

GROUND WATER IN UPPER PLEISTOCENE DEPOSITS

OCCURRENCE

The 200 feet of upper Pleistocene deposits in the Upton area consists of sand and gravel, some silt and clay layers, and also some till in the two morainal areas. Water first enters through the soil zone. The zone of aeration, about 50–60 feet in average depth, serves both as a sizable underground reservoir and also as the conduit for water moving downward to the zone of saturation. Locally within the zone of aeration are bodies of perched and semiperched water, held up by layers of relatively impermeable material, one each in the northern, northwestern,

and eastern sections of the Laboratory tract, and one east of the Laboratory tract beyond the Peconic River. A few small areas of this kind occur in the extreme west-central section of the Upton area. The major areas underlain by relatively impermeable layers above the zone of saturation are shown on plates 1–4.

The zone of saturation in the upper Pleistocene deposits averages about 140–150 feet in thickness. This zone serves both as an immense storage reservoir and also as the principal conduit for water moving from points of recharge to points of discharge.

THE WATER TABLE

MAPS OF THE WATER TABLE

The water table in the Upton area is defined by the position of the static water level in wells ending in the zone of saturation in the upper Pleistocene and Recent deposits. Plates 1 and 2 show the position of the water table on August 29–31, 1951, and July 28–30, 1952. The water-level contours are based on readings in about 120 wells, 50 of them inside the Laboratory area, and also on the altitudes of the water surface in streams, ditches, ponds, and lakes at about 35 additional points. Only a few of the wells are plotted on plates 1 and 2. Plates 3 and 4 show the position of the water table on October 1–3, 1952, and April 25, 1953, and also the locations of all the observation wells within the Laboratory area.

NETWORK OF OBSERVATION WELLS

A table giving complete information on the location, owner, use, depth, method of construction, size of casing, screen setting, altitude of measuring point, and height above land surface for all wells used in this study is on file with the U.S. Geological Survey and State and Laboratory authorities. The well numbers, assigned by the New York State Water Power and Control Commission in chronological order, have no particular geographical significance. The letter S preceding the number signifies Suffolk County. The code numbers of the points used in determining surface-water stages were assigned by the Survey staff at Brookhaven National Laboratory. Letters C and P preceding the number are for measuring points on or near the Carmans and Peconic Rivers, respectively. Some points on the larger lakes or ponds are identified only by their names. The tables on file also give information on the location of all measuring points other than wells, and also their descriptions, altitudes, and the altitude of the accompanying bench marks.

Third-order accuracy (or better) was maintained in the leveling used to determine the altitudes of the measuring points at wells, of the surface-water observation stations, and of bench marks; that is, the error of closure of the level circuit, in feet, did not exceed the length of circuit, in miles, divided by 0.5. For short runs the allowable error of closure, in feet, did not exceed the number of setups divided by 0.008. All levels are referred to the 1929 mean sea-level datum of the U.S. Coast and Geodetic Survey. Observed water levels are accurate within at least 0.1 foot.

RELATION OF WATER TABLE TO SHALLOW, PARTLY CONFINING LAYERS

In some areas (see pls. 1–4) of low permeability, beds of silt or clay occur in the zone of aeration. In these areas, where shallow water is perched or semiperched, the water table is defined by water levels in wells screened below this material. The maximum depth of this retarding zone below land surface is about 30 feet; only at well S9123 east of the Laboratory was the bottom of the less permeable material found to be deeper, at about 50 feet below land surface. The water surface, mapped in plates 1–4 will be referred to as the water table, even though the water is confined to some degree part of the time in localities where less permeable material occurs at shallow depths.

In the Peconic River valley east of the Laboratory, from about Manorville to Riverland, an intersubstage (de Laguna, 1963, p. 32) occurs at about middepth in the glacial sands. In this locality the water-table map is based on levels in wells ending above this clay.

SIGNIFICANT FEATURES OF THE WATER TABLE

The shape of the water table reflects the location of areas of recharge, areas of discharge, and of the ground-water divides. (See pls. 1–4; fig. 34A.) The water table in the Upton area suggests the cross section of a bullet, flattened at the tip and pointing eastward; the south side is somewhat irregular. The depressions and troughs in the contour pattern are ground-water discharge areas.

In the Upton area, the main ground-water divides lies about 3–5 miles south of Long Island Sound and roughly parallel to it. East of the eastern boundary of the Laboratory tract a second ground-water divide appears, which defines the southern boundary of the area contributing ground water to the Peconic. The north branch of the divide extends beyond the Upton area into the North Fork of Suffolk County, and the south branch extends into the South Fork. There are not enough water-level data to define the south branch accurately.

North of the divide, ground water moves northward to Long Island Sound. South of the divide, the ground water moves southward to Great South Bay and Moriches Bay, either directly or by way of streams. In general, the ground water from the area between the two branches of the divide moves out eastward to the Peconic River and

Peconic Bay. Details of the movement vary with the stage and slope of the water table.

The highest part of the water table in the Upton area is the west-central section where it is about 55 feet above sea level; the lowest is along the shoreline, where it stands at about mean sea level. A few miles west of the Upton area (fig. 34A), the water table is about 60 feet above sea level (Luszczynski and Johnson, 1951). The slope of the water table ranges from more than 10 feet per mile to less than 2 feet per mile; in the Laboratory tract, the slope averages about 5 feet per mile.

DEPTH TO WATER TABLE

The depth to the water table in the Upton area ranges from less than 0.1 foot along the shorelines to more than 200 feet under the higher hills on the north shore and averages about 50–60 feet. North of the ground-water divide, and along the south branch of the divide, the average depth to the water table is about 80 feet; between the divides and to the south it is about 40 feet. Figure 8 gives five north-south profiles (pls. 1, 2) showing the water-table altitudes as of July 28–30, 1952, when the water table was slightly below the average stage for 1941–53. As the sections show, from the north shore the land surface rises abruptly about 150 feet or more to a line of hills, part of the Harbor Hill moraine. Here the depths to water are from 75 to 150 feet and locally even 200 feet. Just south of the Laboratory area, the water table is also relatively deep beneath another line of east-west hills known as the Ronkonkoma moraine. Profiles showing the approximate altitudes of the land surface and the water table are shown in figure 8. In the low land between the two moraines the water table is at somewhat shallower depths, and because this wide valley slopes gently eastward, in the eastern part of the Laboratory area and in the Manorville area the water table is even shallower, within 5–10 feet of the land surface. The Peconic River originates in this valley and flows eastward between the two moraines. The headwaters of the Carmans River also lie in this intermoraine belt. South of the Ronkonkoma moraine, the land slopes gently toward the south, and the depth to water decreases southward, so that the land surface and the water table converge.

Figure 9 shows the depth from the land surface to the water table in the Laboratory tract. The depths vary from less than 10 feet along streams in the eastern and northern parts of the Laboratory, to more than 80 feet in a belt extending from the center of the Laboratory tract, near the reactor, to the hospital in the southwest corner. The average depth to the water table is about 45 feet. Land-surface altitudes for this depth-to-water map were taken from the 10-foot con-

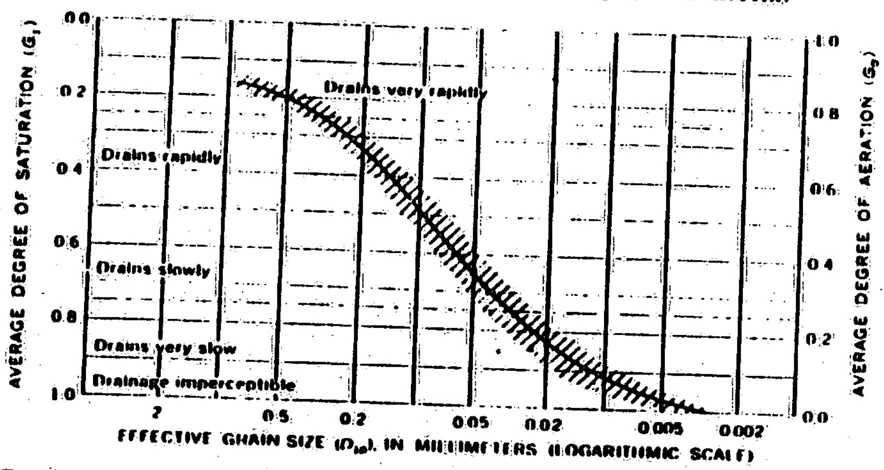


FIGURE 15.—Relation of effective grain size to average degree of liquid saturation in pores of unconsolidated formations (from field observations after Terzaghi, 1949). Diagonal lines represent probable range of seasonal variations.

to that of a sand composed entirely of grains of the effective size. The uniformity coefficient, also defined by Hazen, is the ratio of D_{60}/D_{10}, or the ratio of that grain size chosen so that 60 percent of the sample by weight is of a smaller grain size, to the effective size.

The effective size of nine samples from the upper 135 feet of well S6456 (table 6) near the center of the Laboratory area averaged 0.134 mm; the uniformity coefficient was 4.7. Samples from three wells, S6456, S6458, and S4660, selected by visual inspection as typical glacial outwash sand, were somewhat coarser grained, having effective sizes of 0.25, 0.17, and 0.30 mm and uniformity coefficients of 2.0, 2.4, and 1.8. Figure 15 shows that for a sand having an effective size of 0.20 mm, the percentage of liquid saturation ranges seasonally from 0.28 to 0.38.

TABLE 6.—*Effective size and uniformity coefficient of samples of sand, silt, and clay from well S6456*

Depth, in feet below land surface	Type of sample	Effective size, millimeter	Uniformity coefficient 60 percent size to 10 percent size
0–10	Auger	0.23	2.3
10–20	Core	.35	15.4
20–30	Bailer	.16	2.5
30–40	Bailer	.18	2.9
40–50	Bailer	.088	4.3
83	Bailer	.096	4.9
104	Bailer	.15	3.0
118	Bailer	.085	5.3
134	Bailer	.19	2.0
159	Bailer	.14	2.3
168	Bailer	.20	2.0
177	Bailer	.092	2.0
215	Core	.13	3.2

Such values appear reasonable for the glacial outwash sand in the Upton area. Both the porosity and the degree of liquid saturation of the glacial sand in the Upton area vary between wide limits under natural hydrologic conditions. Locally, under certain artificial conditions, the percent saturation has approached 100.

Veatch (Veatch and others, 1906) made many laboratory determinations of the porosity of the upper Pleistocene of Long Island, and the approximate average of these, 0.33, is used here. Specific yield and specific retention were determined from field tests; no attempt was made to determine these values in the laboratory from samples. The specific yield of the outwash sand in the Laboratory area was determined, from a 7-day pumping test, to be 0.24. The specific yield, found by filling and draining the pore space in a lysimeter built by de Laguna in 1953, was 0.26. This lysimeter, installed in the southeastern part of the Laboratory area where the average depth to the water table is 13 feet from land surface, is a vertical metal cylinder 12 feet deep and 5 feet in diameter and open at the top. It was set about 7 feet below land surface so that the bottom was 6 feet in the zone of saturation. In excavating and backfilling, care was taken to keep the material in approximately its original sequence and to compact it as nearly as possible to its original degree of compaction. However, the value of 0.24 from the pumping test is preferred because a much larger volume of sediments was involved. 1

A porosity of 0.33 and a specific yield of 0.24 gives a specific retention of 0.33−0.24, or 0.09. On the assumption that 0.28, the low value in the range of liquid saturation in figure 15, is approximately the fraction of the void space filled by specific retention, then specific retention is computed to be 0.28×0.33, or 0.092, which is in good agreement.

The flow-line pattern (fig. 19) in the vicinity of the well pumped during an aquifer test in December 1950 in the Laboratory area suggests that the vertical permeability of the outwash sand in the zone of saturation is about a fourth that of the horizontal permeability, or about 350 gpd per square foot. Results of an infiltration test, discussed in the following section, indicate that the vertical permeability may be as low as 75 gpd per square foot, or about one-eighteenth of the horizontal permeability. 1

RATE OF MOVEMENT IN THE LABORATORY AREA

High rates

If the sand is saturated with water, if the vertical permeability is 350 gpd per square foot, and if the porosity is one-third, then water will move downward in the zone of aeration at a rate of 140 feet a day.

DIRECTION AND RATE OF MOVEMENT OF GROUND WATER UNDER NATURAL CONDITIONS

Plates 1 and 2 show water-table contours for August 29–31, 1951, when the water table was about a half a foot below average, and for July 28–30, 1952, when the water table was 12 feet above average. The direction of ground-water flow may be taken as normal to these contours because the formation is almost isotropic. The rate of flow may be approximately determined by either of two independent methods, one of which is based on consideration of the quantities of water involved, and the other on the relation between transmissibility and the ground-water gradient.

The transmissibility of the upper Pleistocene aquifer is very close to 200,000 gpd at unit gradient. The water-table gradient is about 5 feet to the mile, so that in the Laboratory area each 1-foot width of the aquifer is carrying about 200 gpd, or 26.7 cubic feet per day, which represents a ground-water velocity of about 0.535 foot per day, or about one-third the velocity derived from consideration of the volume of recharge. Thus, in the belt between the Laboratory and the water-table divide, a large proportion of the ground-water recharge, perhaps two-thirds of the total, apparently moves into the deeper Cretaceous aquifers, and only the smaller part moves laterally through the upper Pleistocene aquifer.

A more detailed study of the direction and rate of movement of the ground water in the upper Pleistocene may be based on the map shown in figure 29. The solid flow lines in this figure are based on the water-table map for August 29–31, 1951, and the dashed flow lines on the map for July 28–30, 1952. In general, these lines follow much the same pattern, but, the slight changes in the contours of lines *C–D* and *C′–D′* produced a marked difference in the ultimate destination of the water.

The average annual recharge to the water table is about 22 inches. A strip of land 1 foot wide extending from the water-table divide for a distance of 1 mile in the direction of ground-water flow would contribute annually a volume of about 9,700 cubic feet. The water would flow from the lower end of the strip through the saturated part of the aquifer, about 150 feet thick, which has a porosity of about 0.33. The rate of movement is the same as if 9,700 cubic feet of water a year flowed through an opening 50 feet high and 1 foot wide, or about 195 feet per year or 0.535 foot per day. According to this method of analysis, the rate of movement at any point is directly proportional to the flow-line distance from the water-table divide; thus, under the center of the Laboratory tract, 2.5 miles from the divide, the rate of movement of the ground water would be about 1.6 feet per day.

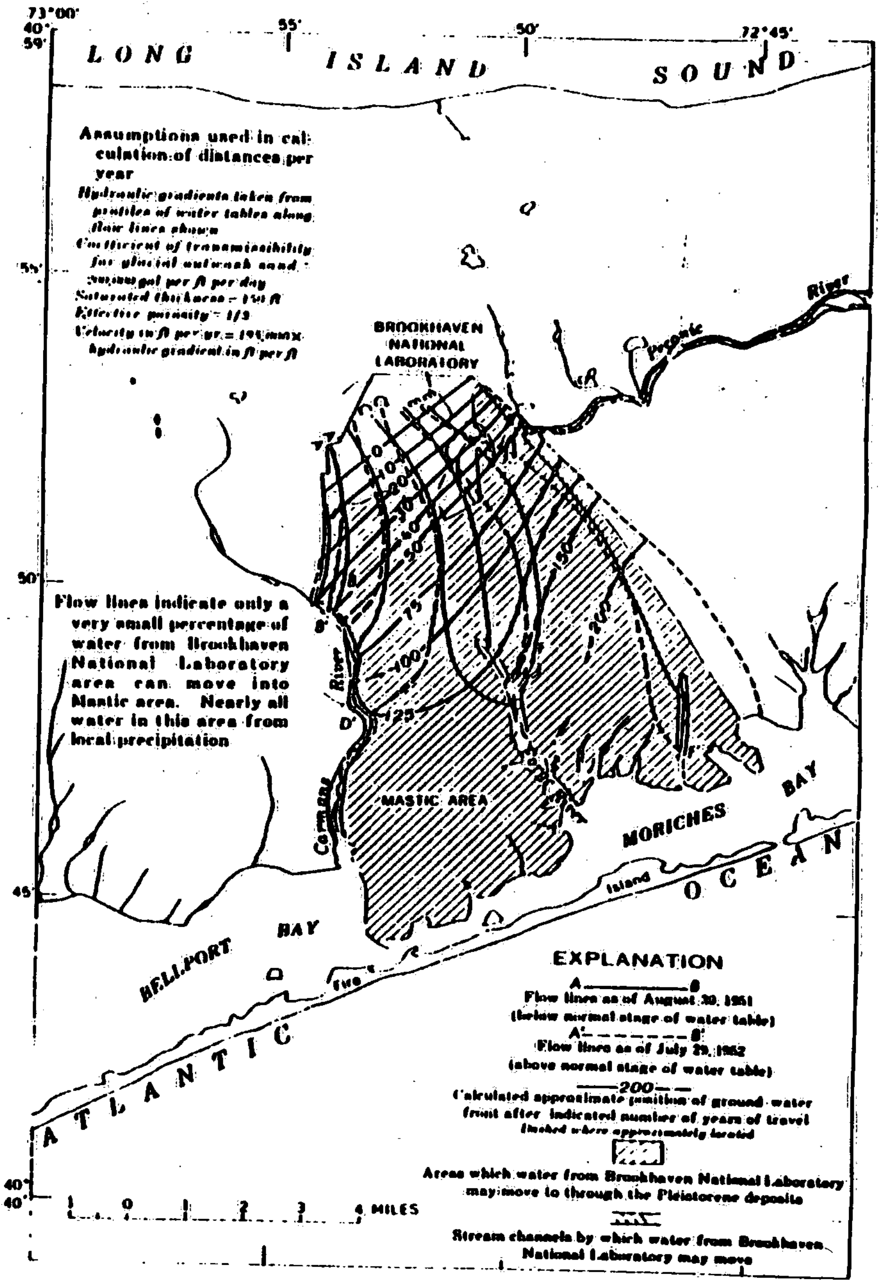


FIGURE 29.—Direction and time of travel of ground water laterally in upper Pleistocene deposits from the Brookhaven National Laboratory area to points of discharge.

Appendix 1.3-6

p 1/2

WORKSHEET: COMMUNITY WATER SUPPLIES WITHIN A 3-mi RADIUS OF THE SITE Oakville Drum Site - 1/11/87

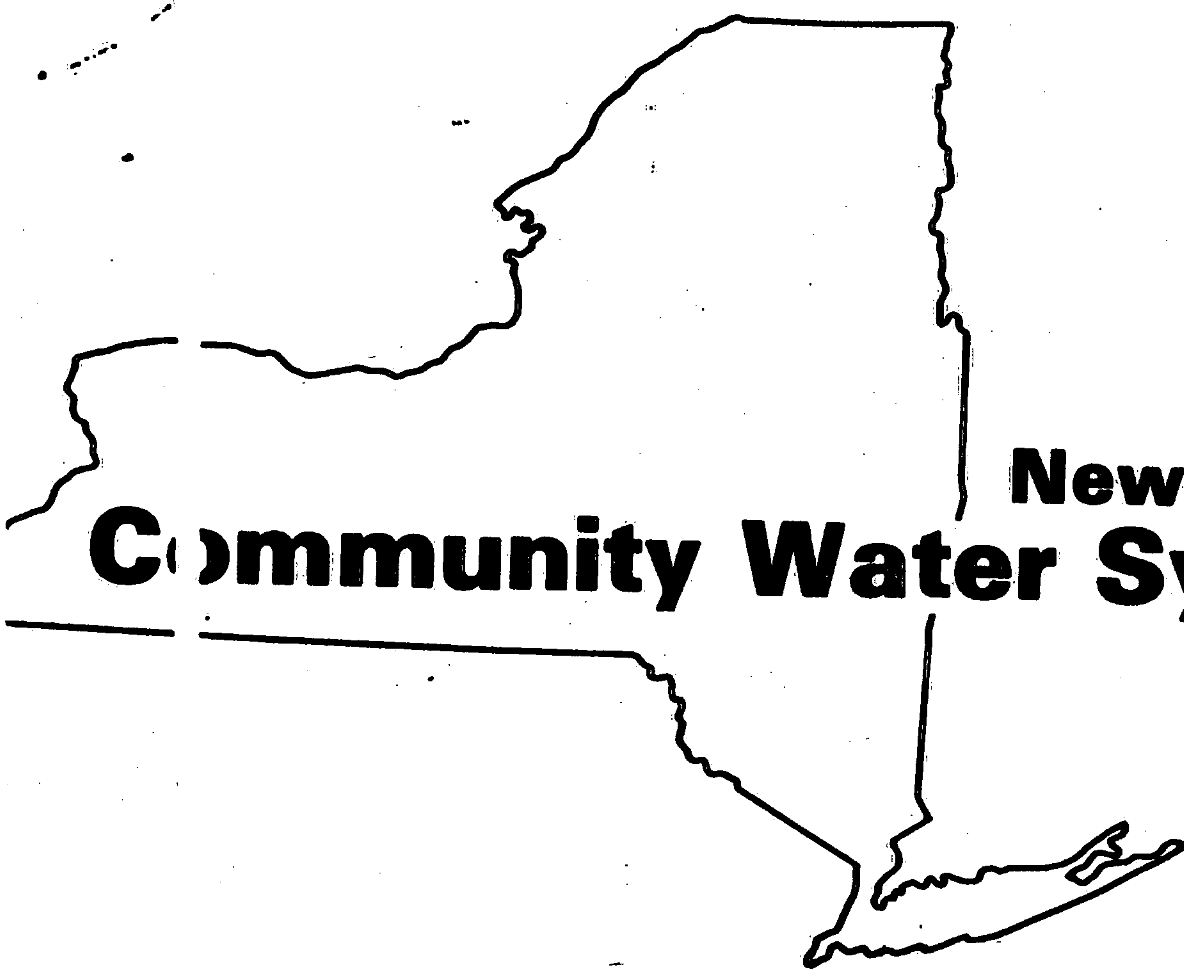
Community Water Supply	Water District	Well Field	Well	Depth (ft)	Aquifer
SCWA	(WB) Westhampton Beach	Spinney Rd.	15-23184	118	Glacial
			25-53593	161	Glacial

East Quogue Mobile Home Estates

Sources:

SCDHS Water Resources Division. Supply and Monitoring Well Location Maps.
SCWA. 1984. Well Descriptions.
SCWA. 1985. Distribution System Plates. 16H and 7H
SCWA. 1986. Active Services Estimates and Service Area Map.
NYSDOH. 1982. New York State Atlas of Community Water System Sources.

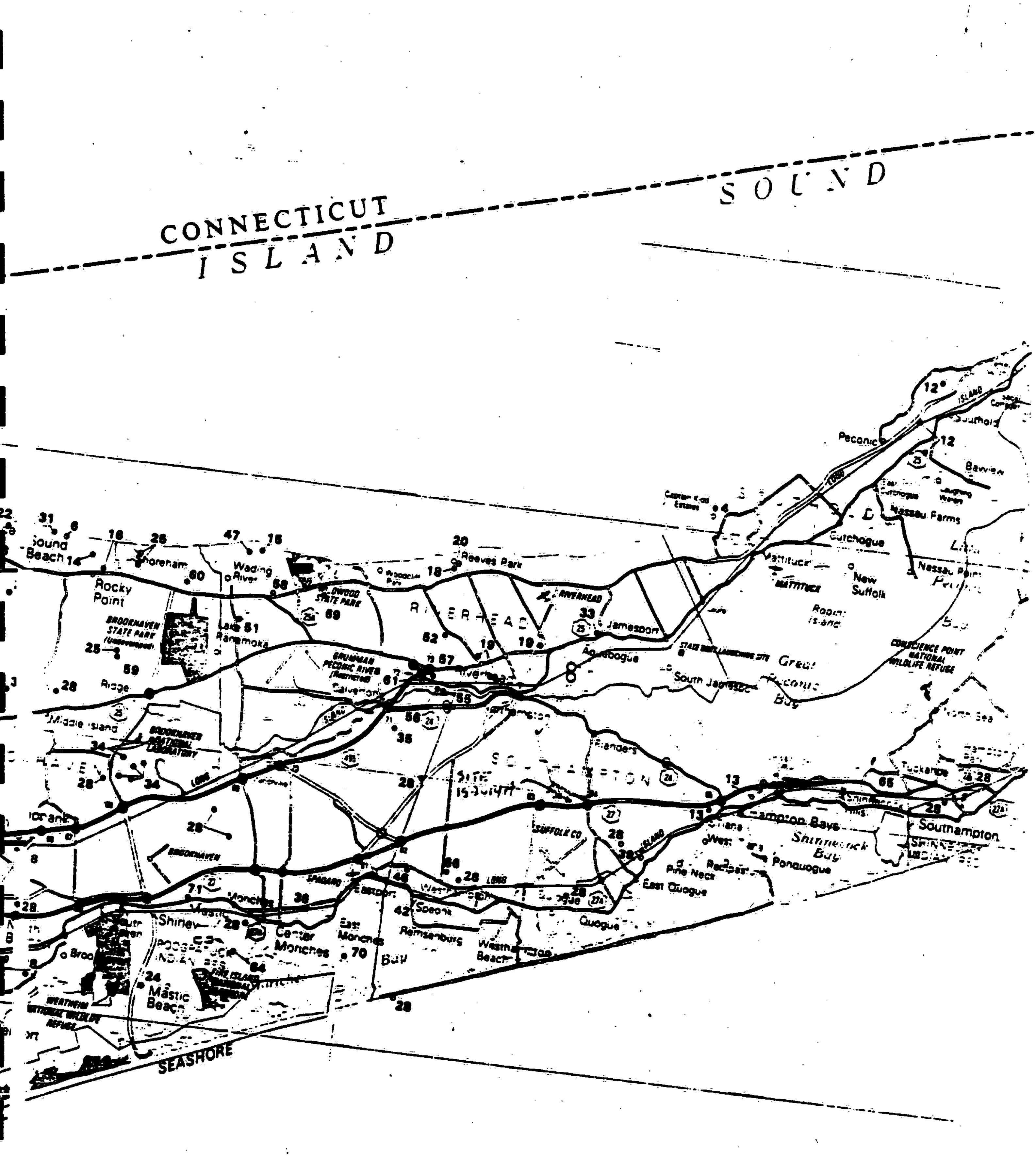

Source: SCWA
Distribution Maps 16H, 17H
Riverhead W.D.
Private Res.
Private Res.
Spinney Rd
SCWA
East Quogue Mobile Estates
Scale 1 in = 1 mi.
N
- Westhampton W.D.
Service Area
Oakville Drum Site
Lilco
152014A



New York State Atlas of Community Water System Sources 1982

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF PUBLIC WATER SUPPLY PROTECTION

Appendix 15-1



SCALE 1:250.000

5 0 5 MILES

NORTH

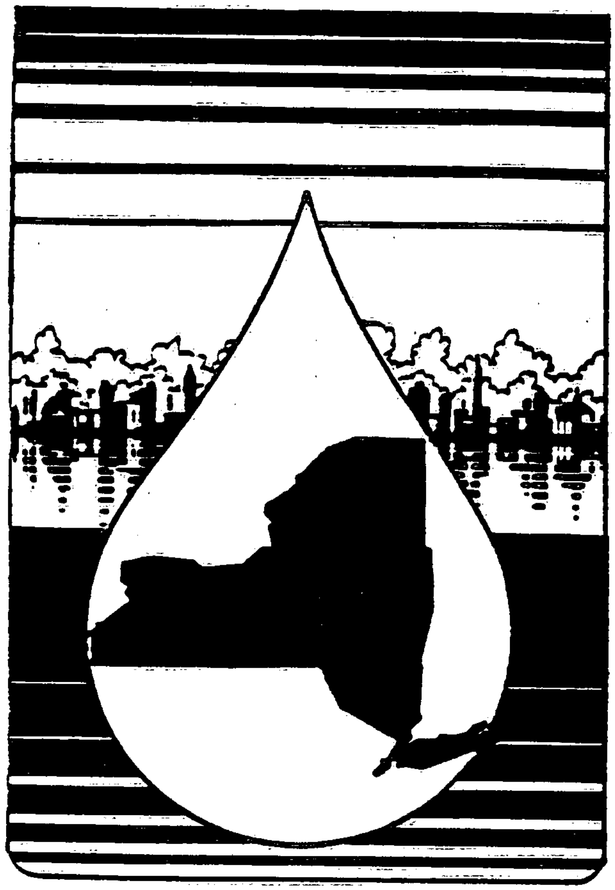
SUFFOLK COUNTY

ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
	Municipal Community		
1	Bevon Water Corporation	1150	Wells
2	Brentwood Water District	25812	Wells
3	Bridgehampton Water Company	1916	Wells
4	Captain Kidd Water Company	580	Wells
5	Crab Meadow Beach	50	Wells
6	Culross Corporation (Culross Beach)	104	Wells
7	Dering Harbor Village	130	Wells
8	Dix Hills Water District	30000	Wells
9	East Farmingdale Water District	7850	Wells
10	Fishers Island Water Works Corporation	250	Barlow, Middle Farms and Treasure Ponds, We
11	Greenlawn Water District	40000	Wells
12	Greenport Village	6851	Wells
13	Hampton Bays Water District	9500	Wells
14	Hawthorne - Maple Civic Association	50	Wells
15	Herod Point Association	80	Wells
16	North Shores Water Company	5000	Wells
17	Ocean Beach Village	155	Wells
18	Reeves Beach Water Company	650	Wells
19	Riverhead Water District	9300	Wells
20	Roanoke Water Corporation	201	Wells
21	Saltaire Village	35	Wells
22	Scott's Beach Water Company	342	Wells
23	Shelter Island Heights Association	498	Wells
24	Shirley Water Works	3400	Wells
25	Shorewood Water Corporation	10000	Wells
26	Soundview Association	236	Wells
27	South Huntington Water District	51250	Wells
28	Suffolk County Water Authority	900000	Wells
29	Sunhill Water Corporation	3959	Wells
30	Swan Lake Water Corporation	1485	Wells
31	Terrace-on-the-Sound	400	Wells
32	Woodbury Triangle Corporation	800	Wells
	Non-Municipal Community		
33	Aquebogue Mobile Home Court	120	Wells
34	Brookhaven National Labs	3373	Wells
35	Calverton Hills Owners Association	897	Wells
36	Cedar Lodge Nursing Home	100	Wells
37	Central Islip Psychiatric Center	4525	Wells
38	Crest Hall Health Related Facility	120	Wells
39	East Quogue Mobile Estates	160	Wells
40	Good Samaritan Hospital	NA	Wells
41	Greis Mobile Park	70	Wells
42	Hampton Gateway Apartments	304	Wells
43	Kings Park Psychiatric Center	3100	Wells
44	Knox School	NA	Wells
45	Lake Hurst Lodge Adult Home	57	Wells
46	Leier's Mobile Park	350	Wells
47	Little Flower Children's Services	150	Wells
48	Montauk Air Force Station	10	Wells
49	Napeague Trailer Park	78	Wells
50	Northport VA Hospital	3000	Wells
51	Oak Park Trailer Park	50	Wells
52	Oakland Ridge Mobile Park	74	Wells
53	Park Lake Rest Home	46	Wells
54	Peacock Alley	35	Wells
55	Peconic River Trailer Park	90	Wells
56	Peconic View Adult Mobile Home Park	70	Wells
57	Pinecrest Garden Apartments	392	Wells
58	Ramblewood Mobile Homes	210	Wells
59	Ridge Rest Home	58	Wells
60	Rocky Point Family Housing	55	Wells
61	Rollin Mobile Homes	220	Wells
62	St Joseph Convent - Long Island University	1177	Wells
63	Sam A Lewison Start Center	40	Wells
64	South Bay Adult Home	40	Wells
65	Southampton College	1000	Wells
66	Speonk Mobile Home Park	50	Wells
67	Suffolk Developmental Center	3500	Wells
68	Three Mile Harbor Trailer Park	40	Wells
69	Thurm's Mobile Estates	450	Wells
70	USCG Station - Moriches	23	Wells
71	Wes Dubicki Apartments	NA	Wells

Appendix 1.5-2

NEW YORK STATE DEPARTMENT OF HEALTH

BUREAU OF PUBLIC WATER SUPPLY PROTECTION



INVENTORY —

COMMUNITY WATER SYSTEMS

NEW YORK STATE
VOLUME II - NON-MUNICIPAL

1984

PREPARED BY

NEW YORK STATE DEPARTMENT OF HEALTH
BUREAU OF PUBLIC WATER SUPPLY PROTECTION
EVALUATION AND ENFORCEMENT SECTION

SUPPLYNAME SUFFOLK COUNTY PROGRAM CODE 120 - MOBILE HOMES	SUPPLY LOCATION (TOWN OR CITY)	DR BA	POP'N. SERVED	SOURCE TYPE G	S	P	AVE. DAILY PRODUCTION (GALLONS)	AVE. DAILY CONSUMPTION (GALLONS)	DIST'N. STORAGE (GALLONS)	PERCENT METERED R	C	I
AQUEBOGUE MOBILE HOME COURT TREATMENT(S): DISINFECTION CORROSION CONTROL	RIVERHEAD (T)	17	120	4	0	0			3000	0	0	0
EAST QUOGUE MOBILE ESTATES TREATMENT(S): NONE	SOUTHAMPTON	17	160	4	0	0			2000	0	0	0
GREIS MOBILE PARK TREATMENT(S): SEQUESTRATION DEMINERALIZATION	SMITHTOWN	17	70	1	0	0			120	0	C	0
LEILR'S MOBILE PARK TREATMENT(S): NONE	SOUTHAMPTON	17	350	2	0	0			5000	0	0	0
NAPEAGUE TRAILER PARK TREATMENT(S): NONE	EASTHAMPTON (T)	17	78	3	0	0			1650	0	0	0
OAK PARK TRAILER PARK TREATMENT(S): NONE	RIVERHEAD (T)	17	50	1	0	0			120	0	0	0
OAKLAND RIDGE MOBILE PARK TREATMENT(S): NONE	RIVERHEAD	17	120	1	0	0	5500	5500	1000	0	0	0
PECONIC RIVER TRAILER PARK TREATMENT(S): *DISINFECTION	RIVERHEAD	17	90	1	0	0			82	0	0	0
PECONIC RIVERVIEW ADULT MHP TREATMENT(S): *DISINFECTION SEQUESTRATION	RIVERHEAD	17	70	2	0	0			160	0	0	0
RAMBLEWOOD MOBILE HOMES TREATMENT(S): NONE	RIVERHEAD (T)	17	210	2	0	0	12000	11000	4000	0	0	0
ROLLIN MOBILE HOMES TREATMENT(S): NONE	RIVERHEAD (T)	17	220	3	0	0			3000	0	0	0
SPEONK MOBILE HOME PARK TREATMENT(S): NONE	SOUTHAMPTON (I)	17	60	2	0	0			240	0	0	0
THREE MILE HARBOR TRAILER PARK TREATMENT(S): SEQUESTRATION	EAST HAMPTON	17	40	3	0	0			1000	0	0	0
THURM'S MOBILE ESTATES TREATMENT(S): DISINFECTION	RIVERHEAD	17	450	2	0	0	38000	38000	6000	0	0	0
PROGRAM CODE 123 - APARTMENTS												
CALVERTON HILLS OWNERS ASSN TREATMENT(S): DISINFECTION	BROOKHAVEN (T)	17	897	2	0	0	52000	52000	30000	0	0	0
HAMPTON GATEWAY APARTMENTS TREATMENT(S): IRON/MANGANESE REMOVAL	SOUTHAMPTON T	17	60	2	0	0	500	500	1000	0	0	0

Appendix 1.5-3

SUFFOLK COUNTY WATER AUTHORITY

Oakdale, New York

ACTIVE SERVICES

December 1985

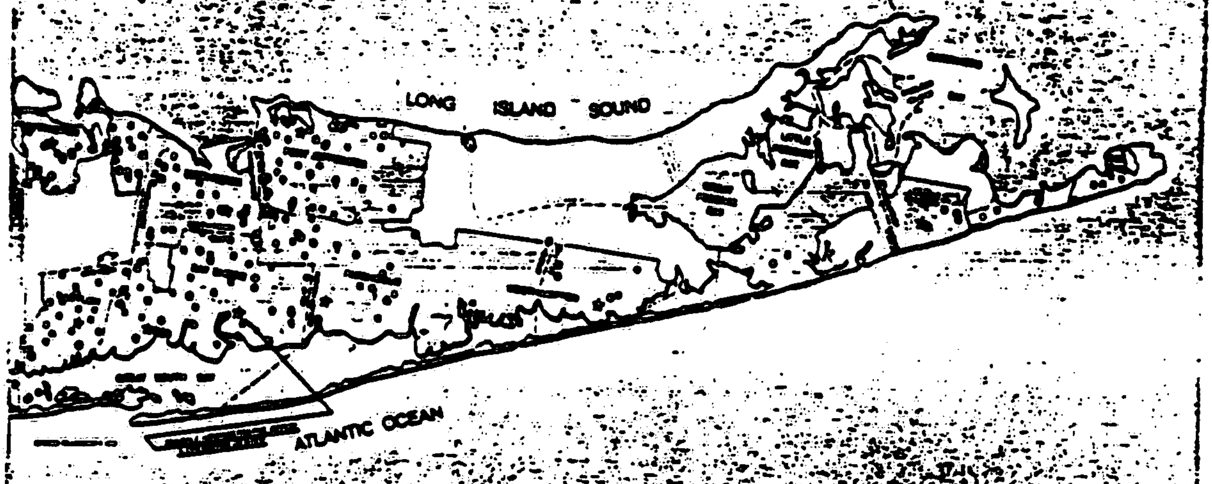
DISTRICT OFFICES	1983	1984	1985	Increase or Decrease 1985/84
BABYLON	53 647	53 995	54 655	660
BAY SHORE	46 846	47 269	47 830	561
PATCHOGUE	49 408	51 412	55 104*	3692
HUNTINGTON	28 303	28 530	28 794	264
PORT JEFFERSON	32 881	33 524	34 440	916
SMITHTOWN	22 832	23 257	23 641	384
WESTHAMPTON	4 089	4 451	4 984	533
EAST HAMPTON	10 245	10 523	10 841	318
TOTAL FOR AUTHORITY	248 251	252 961	260 289	7328

* which 1690 Services are in the Montauk Section

*Includes 970 Active Services Acquired from Shirley Water Works Co. 3/29/85

cc: Messrs. Hazlitt, Hanrahan, Sidoti, Schickler, Koehler, Dugan, Daly and Cannon
jh - 2/4/86

Communities Served:



☐ SCWA SERVICE AREAS ■ WELL FIELD & PUMP STATIONS ★ COMMERCIAL OFFICES ○ STORAGE FACILITY

BABYLON DISTRICT
Amity Harbor
Amityville
Babylon
Copiague
Deer Park
Dix Hills
Lindenhurst
North Amityville
North Babylon
North Lindenhurst
Pinelawn
West Babylon
Wheatley Heights
Wyandanch

BAY SHORE DISTRICT
Bay Shore
Brentwood
Brightwaters
Central Islip
East Islip
Edgewood
Great River
Islip
Islip Terrace
North Bay Shore
North Great River
Oakdale
West Bay Shore
West Islip

HUNTINGTON DISTRICT
Asharoken
Centerport
Cold Spring Harbor
Commack
Crab Meadow
East Huntington
East Neck
East Northport
Eatons Neck
Fort Salonga
Halesite
Huntington
Huntington Bay
Huntington Station
Lloyd Harbor
Northport

EAST HAMPTON DISTRICT
Amagansett
East Hampton
Freetown
Montauk
North Sea
Sag Harbor
Southampton

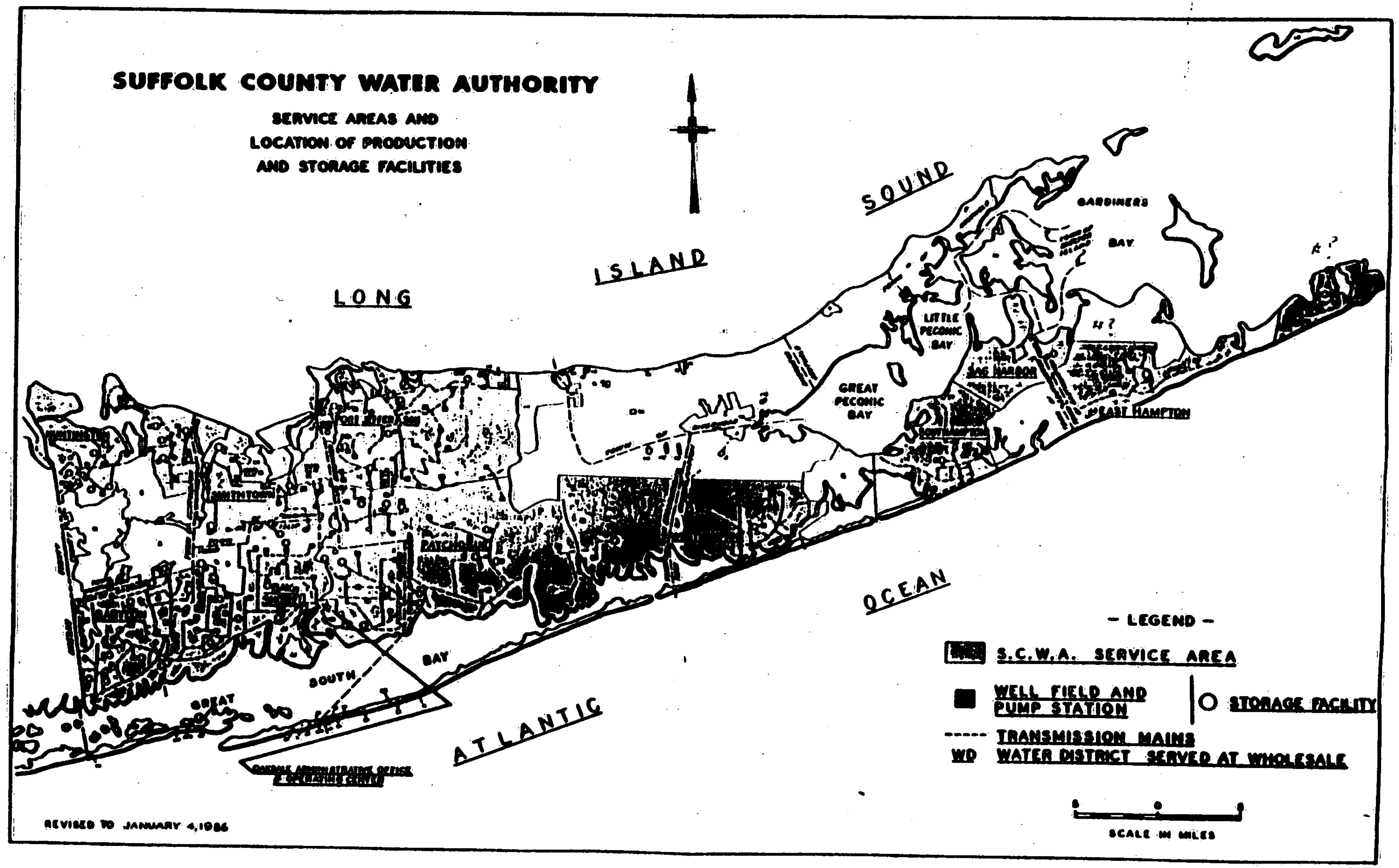
PATCHOGUE DISTRICT
Bayport
Bellport
Blue Point
Bohemia
Brookhaven
Coram
East Holbrook
East Patchogue
Farmingville
Gordon Heights
Holbrook
Holtsville
Lakeland
Lake Ronkonkoma
Mastic
Mastic Beach
Medford
North Bellport
North Patchogue
Patchogue
Ronkonkoma
Sayville
Selden
Shirley
South Centereach
South Holbrook
South Yaphank
West Bellport
West Ronkonkoma
West Sayville
Yaphank

PORT JEFFERSON DISTRICT
Belle Terre
Centereach
Coram
East Setauket
Lake Grove
Middle Island
Miller Place
Mount Sinai
North Centereach
North Selden
Poquott
Port Jefferson
Port Jefferson Station
Ridge
Rocky Point
Setauket
South Setauket
Sound Beach
South Stony Brook
Stony Brook*
Strongs Neck
Terryville

SMITHTOWN DISTRICT
East Commack
Flowerfield*
Hauppauge
Kings Park
Nesconset
Saint James*
San Remo*
Smithtown
South Hauppauge
West St. James
West Smithtown*
Village of Head of The Harbor
Village of The Branch

WESTHAMPTON DISTRICT
Center Moriches
East Moriches
Eastport
East Quogue
Moriches
South Manor
Quiogue
Quogue
Westhampton
Westhampton Beach

* Included in Wholesale Water District


SUFFOLK COUNTY WATER AUTHORITY
SERVICE AREAS AND
LOCATION OF PRODUCTION
AND STORAGE FACILITIES
LONG
ISLAND
SOUND
GARDINERS
BAY
LITTLE
PECONIC
BAY
GREAT
PECONIC
BAY
SAG HARBOR
SOUTHAMPTON
EAST HAMPTON
SMITHTOWN
PATCHOGUE
GREAT
SOUTH
BAY
ATLANTIC
OCEAN
- LEGEND -
S.C.W.A. SERVICE AREA
WELL FIELD AND
PUMP STATION
STORAGE FACILITY
TRANSMISSION MAINS
WD WATER DISTRICT SERVED AT WHOLESALE
SCALE IN MILES
REVISED TO JANUARY 4,1986

Appendix 1.5-4

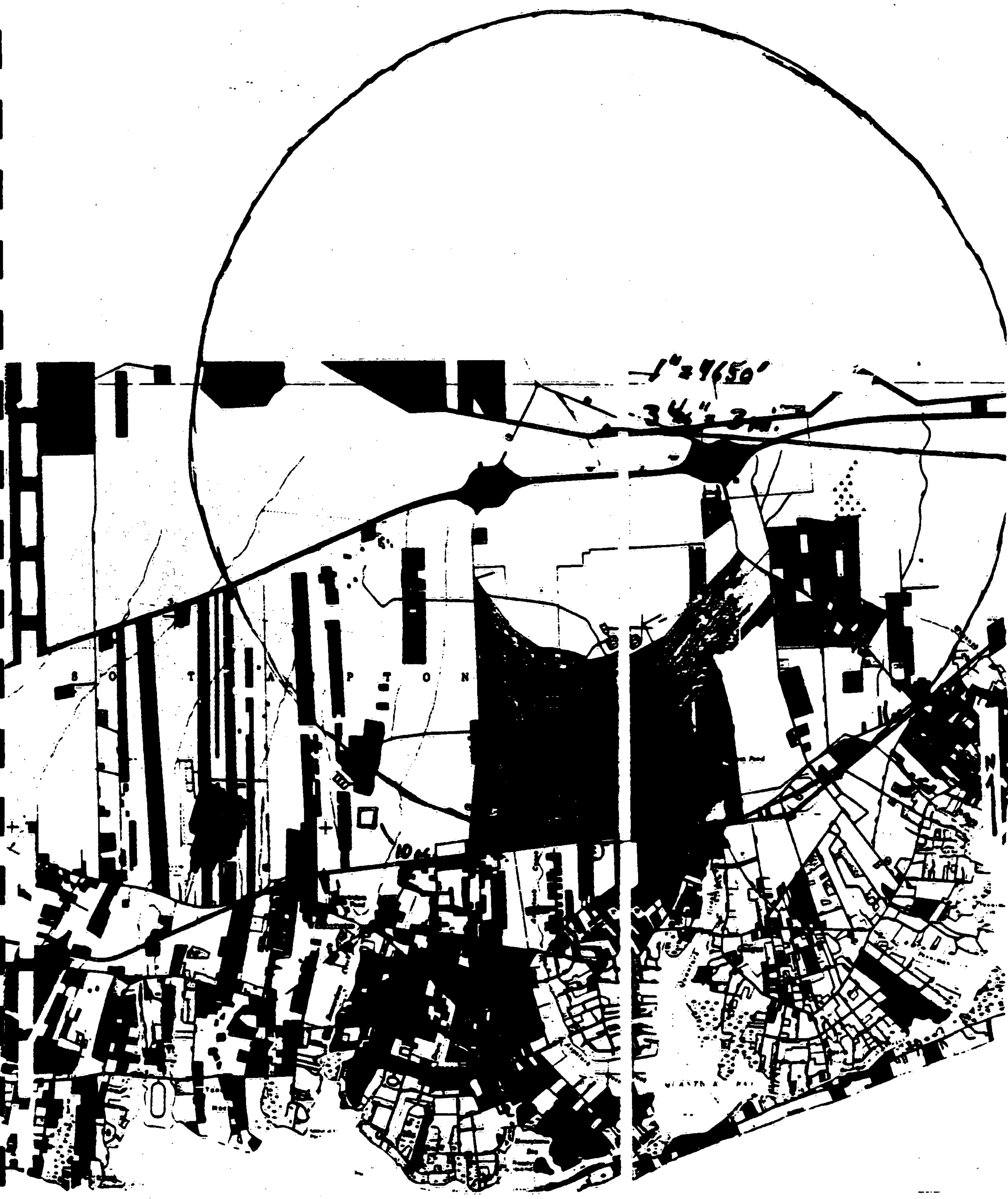
LAND USE - 1981

Quantification and Analysis of Land Use for Nassau and Suffolk Counties

AREAWIDE
WASTE TREATMENT
MANAGEMENT

December 1982

Long Island Regional Planning Board


1" = 4650'
3 1/4" = 3 mi.
S O U T H A M P T O N
10 mi.
N

p. 3-14

8.4.74

LEGEND

RESIDENTIAL

- 1 D.U. & Less/Acre (low density)
- 2-4 D.U./Acre
- 5-10 D.U./Acre
- 11 D.U. & Over/Acre (high density)

- Commercial
- Commercial Recreation
- Industrial
- Institutional
- Open Space & Recreational
- Agricultural
- Transportation & Utilities
- Vacant

Appendix 1.5-5

United States
Department of
Agriculture

Soil
Conservation
Service

127 East Main Street
Riverhead, New York 11901

March 13, 1986

Mr. William L. Going, Manager
Environmental Assessment Studies
EA Science and Technology
R.D. 2, Box 91
Middletown, New York 10940

Dear Mr. Going:

This office has not compiled any information on the number of acres irrigated based on specific locations in Suffolk County. The 1982 Census of Agriculture estimates that 23,232 acres are irrigated on 500 farms, however, the specific locations of this acreage is not readily available.

The major source of irrigation water in Suffolk County is groundwater through wells. There are literally thousands of wells scattered throughout the county. To locate wells within a three mile radius of the inactive hazardous waste sites would be an impossible task.

Just to inventory the irrigated acres in proximity to these sites would be very time consuming. I do not have the manpower nor the time at present to accomplish such a task.

I would be more than willing to provide you with access to our aerial photographs, soil maps, topographic surveys and other technical information which might be helpful to you in making this inventory.

If you have any questions or I may be of further assistance, call me at 516-727-2315.

Sincerely,

Allan S. Connell

Allan S. Connell,
District Conservationist

3/28/86 Mr. Connell says that the 23,232 a/500 farm represent the vast majority ... up to 90% ... for Suffolk Co. and that I can assume all irrigated ... so I will consult ag. [illegible]

[illegible]

Appendix 1.5-6

EA SCIENCE AND TECHNOLOGY

A Division of EA Engineering, Science, and Technology, Inc.

COMMUNICATIONS RECORD FORM

Distribution: ( ) Suffolk Co General, ( ) ________
( ) ________, ( ) ________
( ) Author

Person Contacted: Mr. Dan Fricke Date: 4-7-86

Phone Number: 516 727 7850 Title: Coop Ext. Ag. Agent

Affiliation: Suffolk Co. Coop Ext. Assn. Type of Contact: Phone

Address: 264 Griffing Ave. Riverhead NY Person Making Contact: Bud

Communications Summary: I asked Dan questions about irrigation practices in Suffolk Co. i.e. could Coop Ext. identify source of irrigation water (wells + surface) and tell us for all irrigated ~~acreage~~ acreage ... which was in food production or dairy farms?

He said that all irrigation wells were supposed to be registered with the State and that perhaps SCDHS had the maps to indicate location and number(s) (Joe Bair?) or (Steve Carey)

* He said there was no surface water used for irrigation on the Island.

He said that once we had located all the wells within required distance of sites, we would have to talk to Coop Ext about each well to find out about the use of the land; very time consuming process.

(see over for additional space)

Signature: William Going

Appendix 1.5-7

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

COMMUNICATIONS RECORD FORM

Distribution: ( ) Suffolk Co. General Files ______
( ) " ______, ( ) ______
( ) Author

Person Contacted: Steve Carey Date: 4-7-86

Phone Number: 516 348 2893 Title: Chief

Affiliation: SCDHS Groundwater Section Type of Contact: Phone

Address: 225 Rabro Dr. Person Making Contact: Bud Going
Hauppauge NY

Communications Summary: I asked him question about source of irrigation water for farmland in food production ---

Steve said wells greater than 45 gpm were registered by NYSDEC Reg 1 except that farms were mostly exempted.

He suggested I contact Doug Pica NYSDEC for information.

(see over for additional space)

Signature: William Going

Appendix 1.5-8

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

COMMUNICATIONS RECORD FORM

Distribution: ( ) Suffolk Co. General Files) ________
( ) ________, ( ) ________
( ) Author

Person Contacted: Mr. Doug Pica Date: 4-7-86

Phone Number: 516 751-7900 Title:

Affiliation: NYSDEC Reg 1 Water Unit Type of Contact: Phone

Address: Stonybrook NY Person Making Contact: Bud Going

Communications Summary: I asked questions about irrigation practices on Long Island and about regulation of wells (irrigation supply).

Doug said DEC regulated wells that supplied irrigation water to golf courses but did not regulate any farm supply wells because they are exempted from regulation. He therefore has no info on farmland irrigation sources.

(see over for additional space)

Signature: William Going

Appendix 1.5-9

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

COMMUNICATIONS RECORD FORM

Distribution: ( ) Suffolk Airport Canine, Kennel file
( ) ______, ( ) ______
( ) Author

Person Contacted: Charles Guthrie Date: 8/15/86

Phone Number: 516 751 7900 Title: Regional Fisheries Mngr

Affiliation: NYSDEC Bur. Fisheries Type of Contact: Phone

Address: Division Fish + Wildlife Person Making Contact: W. Going
Stony Brook NY 11794

Communications Summary: (Suny Campus - Bldg 40)

I asked Mr Guthrie if the Quantuck Creek, North Pond, and Quogue Wildlife Refuges were in fact recreational resources (per my HRS scoring purposes), and he said they certainly were.

(see over for additional space)

Signature: William Going

Appendix 1.5-10

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

COMMUNICATIONS RECORD FORM

Distribution: ( ) DEC63A, ( ) ____
( ) ____, ( ) ____
( ) Author

Person Contacted: John Ozard Date: 3-6-86

Phone Number: 5184397486 Title: Sr. Wildlife Biologist

Affiliation: NYS DEC Type of Contact: Phone

Address: Delmar NY Person Making Contact: W. Going

Communications Summary: Called John for clarification of the letter, dated 26 February 1986, regarding "significant habitat."...

Q. Don't see any reference to Federally listed Threatened or Endangered spp. on any of the 42 site location maps you sent back w/ your letter... does this mean there is no habitat of concern for these spp? A. yes... there is no critical habitat for (Federal spp) at any of the sites being examined.

Q. Are all the wetlands on LI in the vicinity of our sites (refer to location maps) "coastal" "wetlands"? A. Yes. They all have varying amounts of salt being that near. The Sound or the Ocean, to be considered coastal wetlands... also refer to the ("Natural Heritage") wetlands marked in blue.

(see over for additional space)

Signature: William Going

(47-15-11 (10/83)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SOLID AND HAZARDOUS WASTE

INACTIVE HAZARDOUS WASTE DISPOSAL SITE REPORT

PRIORITY CODE: 2a SITE CODE: 152014A

NAME OF SITE: Oakville Drum Site No. 1 REGION: 1

STREET ADDRESS: Access road off County Route 104

TOWN/CITY: Southampton COUNTY: Suffolk

NAME OF CURRENT OWNER OF SITE: Unknown

ADDRESS OF CURRENT OWNER OF SITE: Unknown

TYPE OF SITE: OPEN DUMP [X] STRUCTURE [ ] LAGOON [ ] LANDFILL [ ] TREATMENT POND [ ]

ESTIMATED SIZE: ½ ACRES

SITE DESCRIPTION:

One hundred and fourteen barrels of powdered and asphalt-like material have been abandoned along a dirt road in the pine barren between Riverhead Road and Route 104, in the Town of Southampton. The barrels apparently contain ordinary products that are used to construct and maintain roads, and might have been left behind after the Sunrise Highway was built in the early 1970s.

HAZARDOUS WASTE DISPOSED: CONFIRMED [ ] SUSPECTED [ ]

TYPE AND QUANTITY OF HAZARDOUS WASTES DISPOSED:

TYPE	QUANTITY (POUNDS, DRUMS, TONS, GALLONS)
Unknown	

TIME PERIOD SITE WAS USED FOR HAZARDOUS WASTE DISPOSAL:

________________, 19___ TO ________________, 19___

OWNER(S) DURING PERIOD OF USE: Unknown

SITE OPERATOR DURING PERIOD OF USE: Not applicable

ADDRESS OF SITE OPERATOR: Not applicable

ANALYTICAL DATA AVAILABLE: AIR [ ] SURFACE WATER [ ] GROUNDWATER [ ]
SOIL [ ] SEDIMENT [ ] NONE [X]

CONTRAVENTION OF STANDARDS: GROUNDWATER [ ] DRINKING WATER [ ]
SURFACE WATER [ ] AIR [ ]

SOIL TYPE: Sandy loam

DEPTH TO GROUNDWATER TABLE: 45-55

LEGAL ACTION: TYPE: None STATE [ ] FEDERAL [ ]
STATUS: IN PROGRESS [ ] COMPLETED [ ]

REMEDIAL ACTION: PROPOSED [ ] UNDER DESIGN [ ]
IN PROGRESS [ ] COMPLETED [ ]

NATURE OF ACTION: ________________

ASSESSMENT OF ENVIRONMENTAL PROBLEMS:

None known.

ASSESSMENT OF HEALTH PROBLEMS:

None known.

PERSON(S) COMPLETING THIS FORM:

FOR NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION	NEW YORK STATE DEPARTMENT OF HEALTH
NAME EA Science and Technology	NAME
TITLE	TITLE
NAME	NAME
TITLE	TITLE
DATE: 10 March 1986	DATE:

REFERENCE NO. 2

0008-F
02-8802-13

NUS CORPORATION

II

0196

1/30/89 Oakville Drum Site (Lilco) 02-8802-13 2

TABLE OF CONTENTS

March 22, 1988 Oakville Drum site (LILCO)
Sunny + Cold low 30's 02-8302-13

3

0930 NUS Personnel arrive by drums

0931 Personnel include:
M. Gentile - site manager
R. Nies - Co investigator

Access road leading to drums is tight. Drums are on left hand side approx. 1/2 mile from 104. Just past the LILCO "right ~~away~~ of way" Drums are in different orders; some lying down the others standing. The Drums seem to be numbered. Some of the drums are open, and contain a white powder. The Drums are rusted and damaged.

0935 NUS take five assorted pictures of drums.

0940 Drums are assorted in two different piles. The numbers go up to 10?. The second pile seems to contain black tar. Drums are among various other garbage

0945 Proceed up dirt road to look for other pile.

0947 1/2 mile up dirt road is guard rail to prevent further access. Also a fence is present. Sunrise Highway approx 50 feet south of the fence.

0952 Proceed along right ~~away~~ of way" drums are on right hand side drums are numbered and seem to contain black tar. They are also rusted and damaged. Approx. 20 drums

0954 Proceed about 20-30 ft of the "right ~~away~~ of way" There are

Michael M Gentile 3-22-88 R. Nies 3/22/88

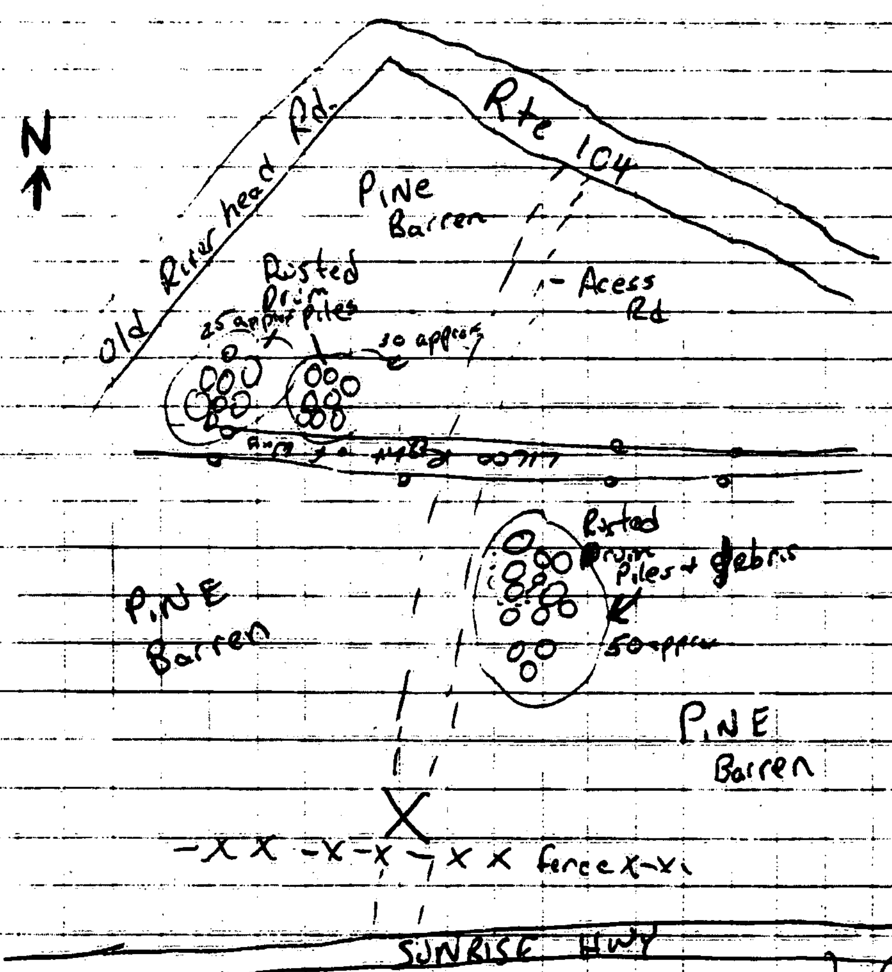
Oakville Drum site   02-8802-13
March 22, 1988

0954 about 30 more drums numbered and rusted. The drums laying in different orders. Some are open, some are closed.

1000 Bob Nier takes 6 pictures of drums. Access road is very sandy. Access is limited.

1015 NUS personnel leave site.

OAKVILLE DRUM SITE (LILCO) SKETCH (NOT TO SCALE)



Note. Soil is all sand and gravel and did not appear to be stain by drums.

Michael N. Gentile 3/22/88   [signature] 3/23/88

7/29/88 Oakville Drum Site
02-8802-13

M. Gentils transferred logbook 0196 to D. Restivo

Michael N. Gentils Donna J. Restivo 7/29/88

Donna J. Restivo 7/29/88

1/04/89 Oakville Drum Site (Lilco)
02-8802-13

Joe Murtaugh assumes custody of notebook 0196 on January 4, 1989.

Joseph Murtaugh 1/4/89

Joseph Murtaugh 1/4/89 [illegible] 1-30-89

1/25/89 Oakville Drum Site 02 3802-137

0925 - NUS personnel arrive on site

Weather - Clear, sunny, 45° F
- winds from NW 10 MPH
- Setup area is at crossroads.
NUS Personnel ARE
JM Joseph Murtaugh - SM / Documentation
RL Rick Lorfing - SSO
ME Mark Ellis - SMO
DG Dave Grupp - Sampler
AL Al Laffen - Sampler

- All of the personnel listed above have read & understood the workplan and QA / QC procedures. RL 1/25/89

0935 - Rick Lorfing gives health & safety meeting
- discusses proper PPE and route to Hospital and Hazards at drum area.

1005 - NUS personnel still setting up and preparing for a Level B on-site recon.

1010 - Equipment to be used will be

OVA ✓	EPA NO.	467759
H-Nu ✓	"	469745
mini rad		423604

- All instrument checkout OK.

Joseph Murtaugh 1/25/89 Kurt Kendler 1-30-89

1/25/89 Oakville Drum Site 02-8302-13 8

1015 - SCBA's to be used EPA no
Dave Graff - Surveillance 192054
Al Latyn 40355!
~~Mark~~ Ellis - Surveillance ~~[illegible]~~
Rick Lording - Backup EPA 40355)

1030 surveying the 1st drum area
located at southend of site
AL and D.G. on air
- 1st cluster of drums
1 ppm on H.nu | on powder substance
6 ppm on OVA | drum 67

- most drums look empty with
black Tar substance on the ground

8 ppm on H.nu - drum 111
8 ppm on OVA (viscous
almost oily => material)

- located in 2nd pile of drums
(still in the 1st cluster)
- this matrix might be sampled
as High Hazard

1035 - D.G & A.L off air

Joseph Muelangh 1/25/89 Kurt Kandler 1-30-89

1/25/89 Oakville Drum site 02-8802-13 9

1033 - Resounding 2nd cluster of drums in west end of site - D.G. & A.L. on air.

- 3 piles of drums - Resounding 1st pile

95 ppm on H-nu in drum

95 ppm on OVA in drum

- readings are on drum 55

(contains a black tar material!

1043 - resounding 2nd pile of drums in 2nd cluster

Drum 32 - Rosiny type substance leaking on top

9 ppm - OVA

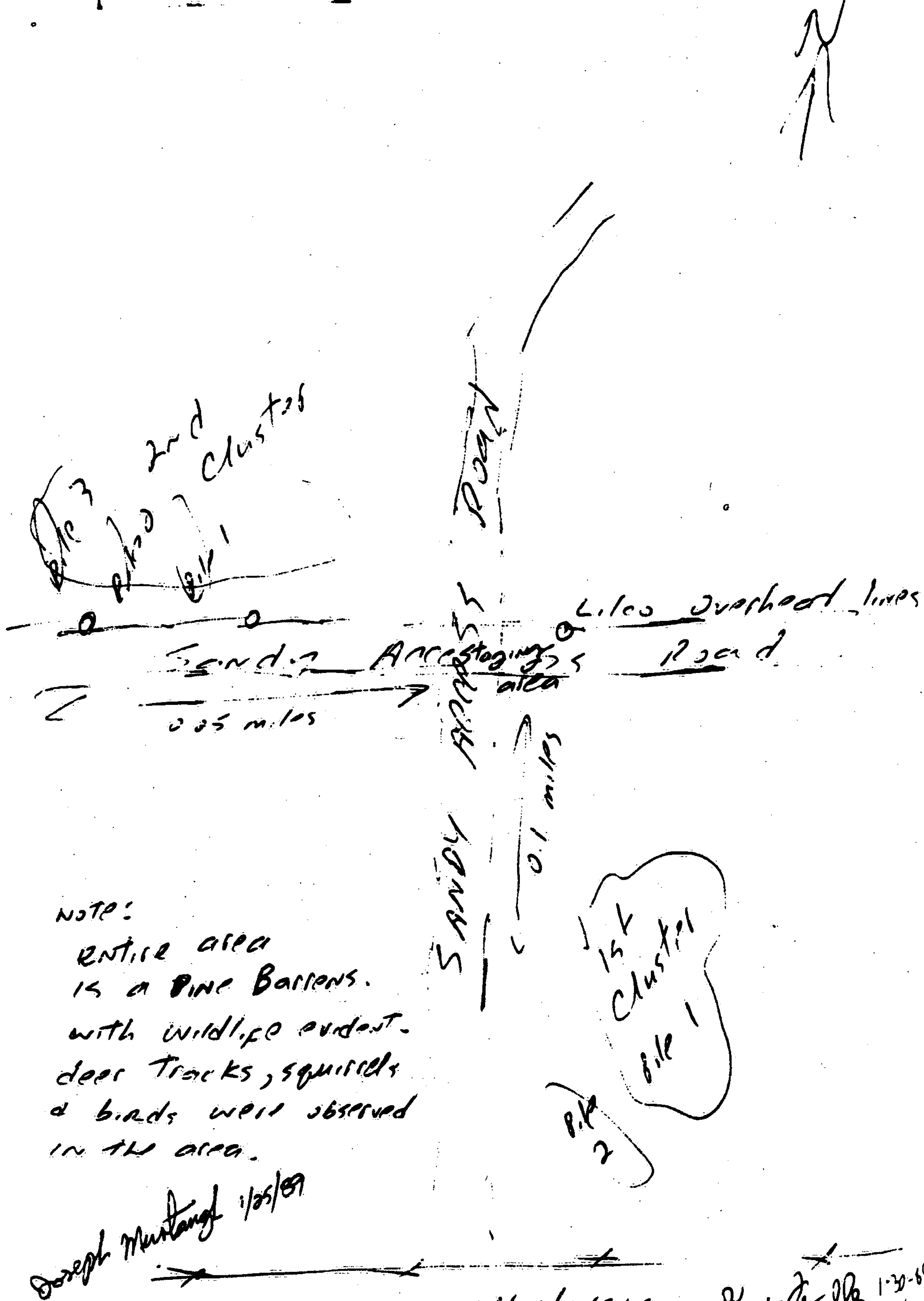
15 ppm - HNU

- no other readings in 2nd pile area

1050 - Resounding 3rd pile of drums (only 2 drums but there is a hard resiny material which has leaked out and a white & Black powdery substance. - No reading ABG on air instruments & minicad

1050 - D.G. and A.L. off air

Joseph Murtaugh 1/25/89 Kurt Fendler 1-30-89



Note:
entire area
is a Pine Barrens.
with wildlife evident.
deer Tracks, squirrels
& birds were observed
in the area.

Joseph Mustang 1/25/89

Kurt [illegible] 1-30-89

1/25/89 Oakville Drum Site 02-3302-13 10
1100 - Mark Ellis collects Trip blank (TRBL-1)
1102 - Back at staging area deconning equipment

JM 1/31/89

- Sampling strategy will be as follows:
- samples S-1, S-2, S-3 will be taken ~~[illegible]~~ at the 1st Cluster of drums, along with a high hazard sample.
S-1, S-2 will be taken in the soil in the 1st pile of drums / 1st Cluster
- The matrix is a powdery substance

- Soil sample ~~S-3~~ S-4 will be taken at the 2nd pile / 1st Cluster in the soil
** Also a high hazard sample will be collected from the area of the viscous material which is leaking onto the ground.
The high hazard sample will be labled S-4 and will be placed into an 8 oz jar.
1/25/89 JM → (Note: after sampling S-3 was decided that sample S-4 will not be high hazard.
Env. duplicate)
- Soil samples ~~[illegible]~~, S-5, and (S-6/S-7) will be taken at the 2nd Cluster area.
- Sample S-8 will be in taken in Soil of Cluster 2 / Pile 1

JM 1/25/89 - ~~Sample S-7 will be taken in Soil of Cluster 2 / Pile 2~~

Joseph Mustang 1/25/89 Kurt Kendler 1-30-89

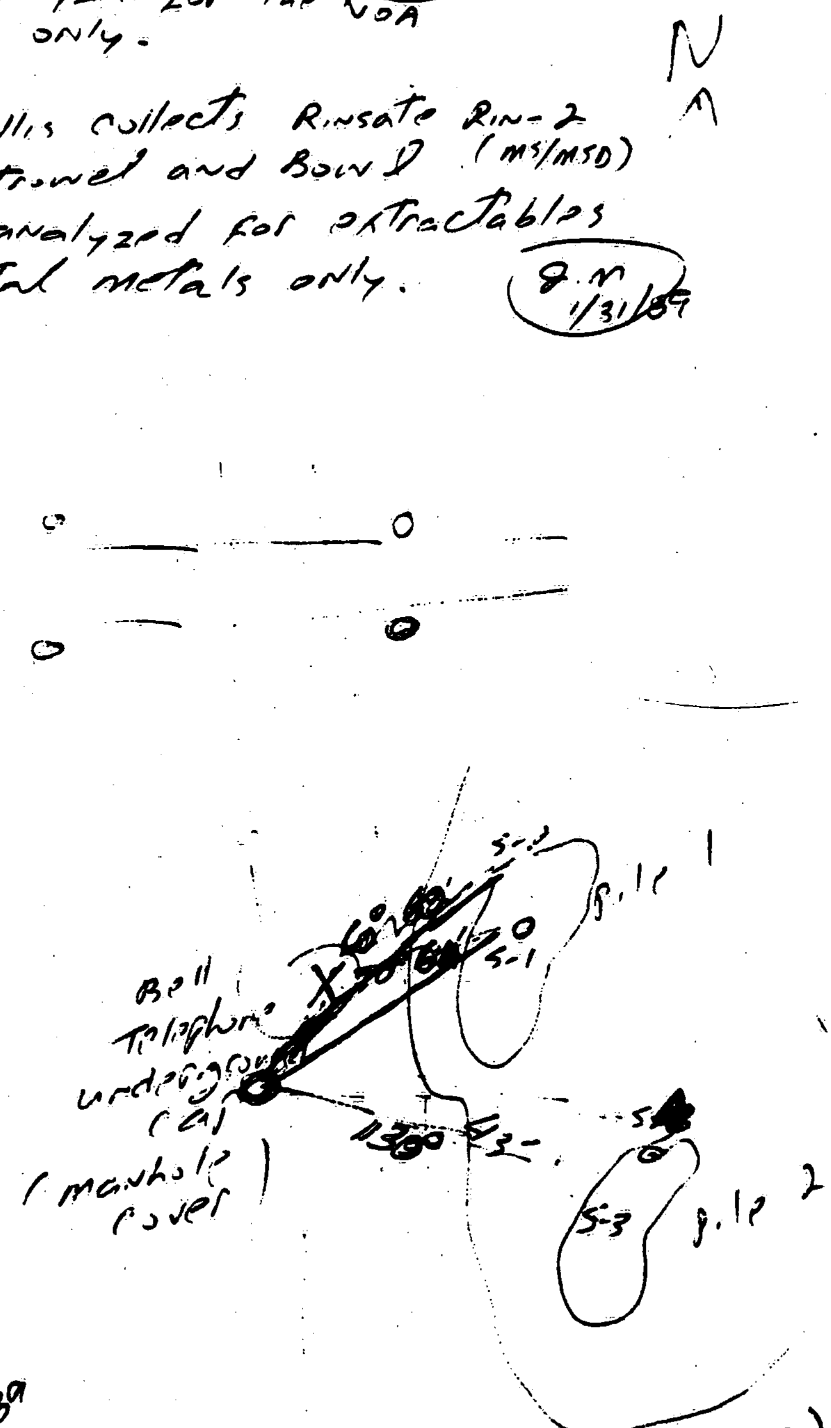
Kendler 1-30-89

1110 - Mark Ellis collects Rinsate RIN-1 (MS/MSD) on a scupula
To be analyzed for the VOA fraction only.

J.M. 1/31/89

1135 - Mark Ellis collects Rinsate RIN-2 on a trowel and Bowl (MS/MSD)
- To be analyzed for extractables and total metals only.

J.M. 1/31/89



[signature] 1/25/89

(see drawing on next page.)

[signature] 1-30-89

(MS/MSD) 1/25/89 Oakville Drum Site 02-8802-13 11

Sample S-6 / S-7 (environmental dup) will be sampled in soil of Cluster 2 / pile 3

- note: all soil samples will be collected at a depth of 0-6 inches.

1133 - arrive at 1st sampling location
- Soil sample S-1 at base of drum # 67 (S-1 is MS/MSD) (drum is leaking)

Description - material is a white & ~~black~~ ~~powdery, ash~~ flakey material
- Soil is a loose dark brown f-sand, moist
- No air readings, ABG on OVA, H-Nu

Location - From [illegible] in road [illegible] at 170° from Bell Telephone Manhole Cover

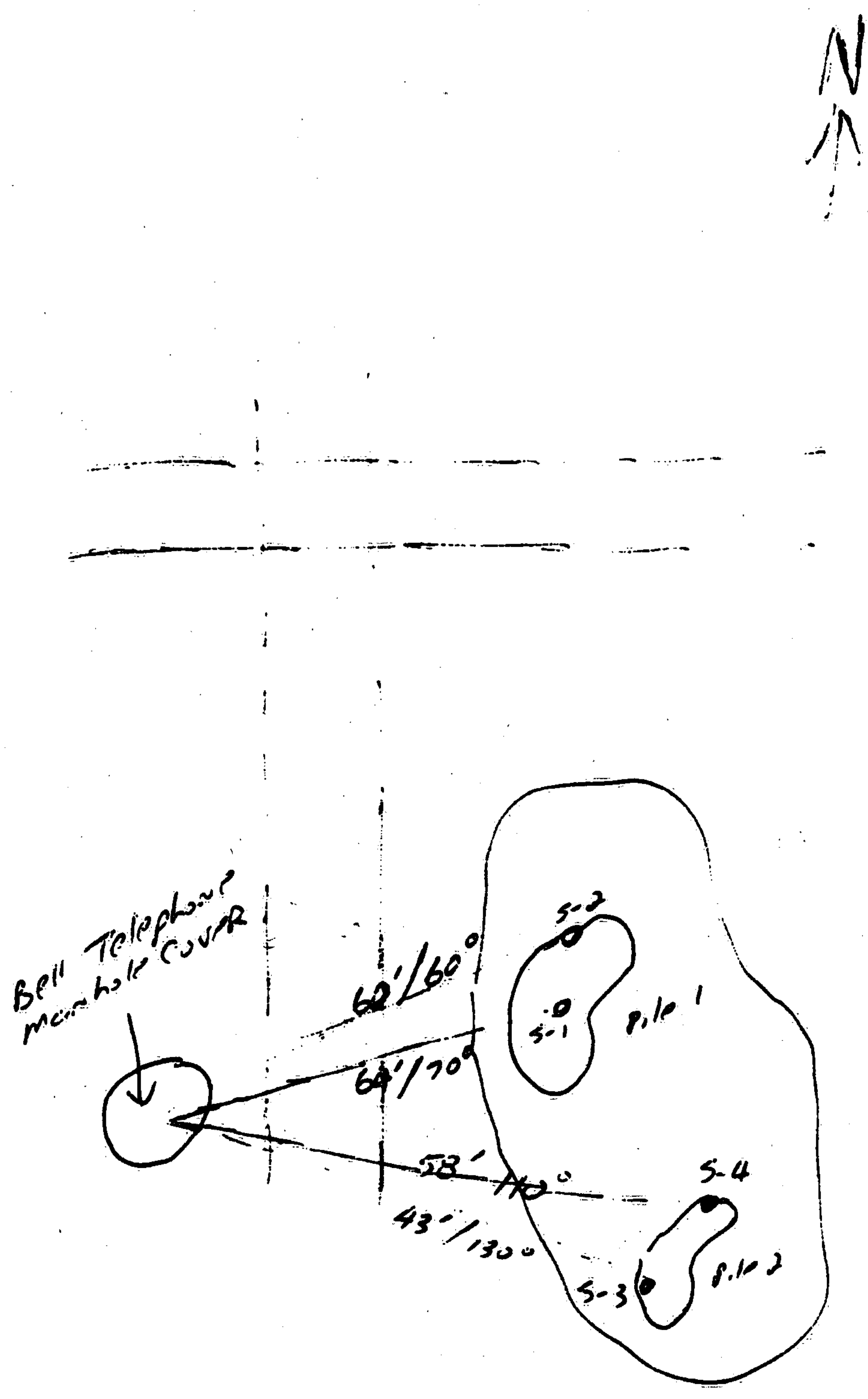
photo 25-2 / 28-2

photo of Dave Grupp sampling soil sample S-1

- 1st pile contains 34 drums
- most drums are full

- 2nd pile contains 21 drums

Joseph [illegible] 1/25/89 Kurt Kendler 1-30-89



Joseph Muntangl 1/25/89

Kurt Kendler 1-30-89

1204 - Soil Sample S-2 will be taken from soil at base of drum 61 located in 1st pile/1st cluster.

Location from Manhole Cover on road
60 feet / 60°

Description : oily material mixed in with dark brown, loose, F-sands, moist

Dave Grupp notes: "This material Hardens the sand"

- sampled at a depth of 0-6 inches

Photo 25-3 / 2P-3
photo of Dave Grupp Sampling soil Sample S-2 At base of drum # 61 - drums are leaking

note: ~~Air readings of 10 ppm on OVA after sample~~ ~~was~~ ~~composited~~
- weird odor noted
- ~~drum that~~ Contains liquid material

Joseph Muntangl 1/25/89 Kurt Tendler 1-30-89
[illegible] 1-30-89

1230 - Soil Sample S-3 will be collected from base of drum 93 located in 1st cluster / 2nd pile
- No reading ABG. on OVA. HNU, mini rad
- Description - Dry brownish powdery material mixed in with Dark Brown, loose F-Sands.

- Location from Bell Telephone manhole Cover is 130° / 43'

- Photo 25-4 / 2P-4
photo of Dave Grupp sampling Soil Sample S-3 at base of drum 93
- Sampled at a depth of 0-6".
1240 - Taking sample bottles back to staging area.

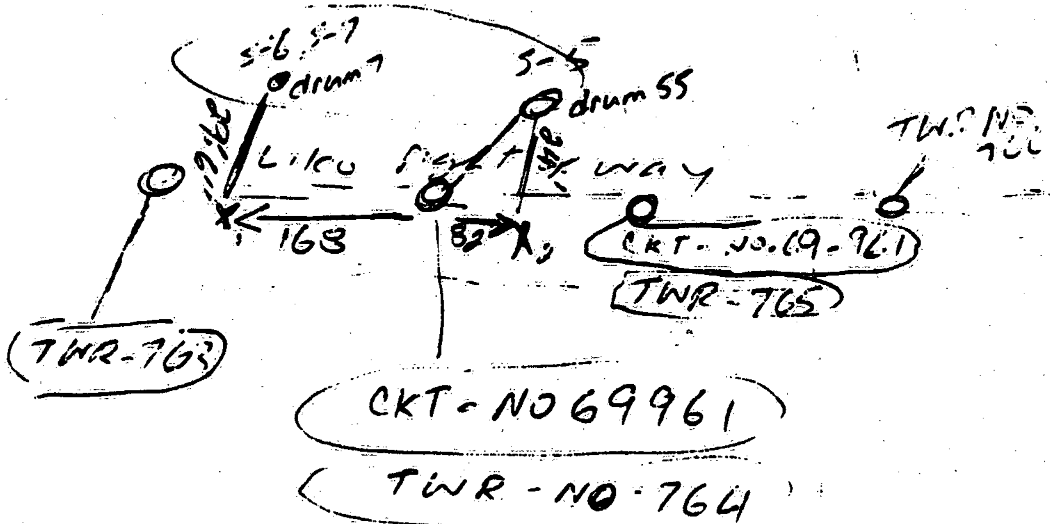
note: we will return to this area to sample S-4 on air, after we are finished sampling S-5, (S-6, S-7).

Joseph Murtaugh 1/25/89 Kurt Kendler 1-30-89

1/25/8

1259

Cluster 2



1305

(see drawing nxt pa

1314

Cluster

1320

Joseph Murtaugh 1/25/89 Kurt [illegible] 1-30-89

Joseph

1259 - Arrive at Sample location S-5. located at 2nd Cluster/1st pile
- Reading of 95 ppm on H-Nu in drum 55

No readings in breathing zone on air instruments but we are going to sample on level B because there is a bad odor around this drum.

- We will come back and sample this location later.

1305 - We are going to Sample location S-6, S-7 Environmental duplicate

- No readings A.B.G. on H-Nu, OVA or miniram.
- sample description / Plasticy Resin / Black powder. Moist mixed with loose Dark Brown F-Sands.
- ~~sample location~~
(see drawing next page) 168 FT from Tower OKT-NO69961 To X. From X to S-6, S-7 - 29'6" 330°
1314 - Photo 25-5/2P-5
photo of Al taking sampling environmental duplicate S-6, S-7
- sampled at a depth of 0-6".
1320 - Photo 25-6/2P-6
photo of resinous material beside drum on the Soil

Joseph Murtaugh 1/25/89 Kurt Kendla 1-30-89

1350 - arrive back at soil sample S-5
- AL Latyn on air / DG backup
- sampling at base of drum 55
- readings of 70 ppm on H-Nu right at hole of drum

Photo 25 / 38-7
photo of AL Latyn taking soil sample S-5 at base of drum 55 located at 2nd Cluster / 1st pile drum location is 82' from turn to X_2. From X_2 to drum 55 24' CKTN369.96 ~~33~~.
- Description: Black oily Chunks mixed with Dk Brown F-Sand, moist
- Sampled at a depth of 0-6".

1405 - Finish Sampling.
- Taking samples back to staging area.
- AL Latyn off air.

1410 - D.G and A.L getting ready for sample S-4

Joseph Murtaugh 1/25/89 [signature] 1-30-89

1415 - Dave Grupp on air
Sample S-4 will be at base of drum 111 located at 1st Cluster/ 2nd pile.
- The drum is covered with a gooey substance which extends to the ground
- readings of 15 ppm on H-NU

Photo 2P8/25-8
photo of Dave Grupp sampling soil sample S-4

Description: Black gooey substance mixed with DK Brown f-sand

Location - 53 feet from Bell Telephone manhole cover 110°

2P9/25-9 - Photo of gooey drum 111

2P-10/25-10 - Photo of drum 111 from rear - showing stained area

1430 - Finish Sampling / D.G. off air
- back to staging area.
- rest of crew packaging samples.
- J.M. and R.G. go back to 2nd cluster / 2nd pile

Joseph Muntangl 1/25/89 Kurt Kendle 1-30-89

1/25/89 Oakville Drum Site 08-3302-13 17

Drums in 2nd Cluster / pile 2

1435 Photo 2P-11 / 25-11
photo of drum with name
MIEL DE ABEJAS

Bruto . . .
TARA . . .
NETO

Drums in 2nd Cluster / pile 1

1440 Photo 2P-12 / 25-12
photo of drum with NAME
CYANAMID

1442 Photo 2P-13 / 25-13
Photo of drum with name:
PERMAG
- specialized scientific cleaners
for every industrial purpose

1455 - Everyone back at setup area
- decon is completed.
- Samples are being ~~labeled~~ wrapped
and packaged

- no one present from site owners
to receive a receipt of samples.

1510 - NUS Personnel leave site.

1600 - Drop samples off at
Federal Express.

~~Joseph~~ Muntangl 1/25/89 Kurt Kindle 1-30-89

- Laboratory Information:

Organic Lab:

Revet Environmental and Analytical Lab.
365 Plantation st
Worchester, MA 01605
Attn: DAVE LAKE

- shipped VIA Federal Express
Airbill # 273832805l

Inorganic Lab:

Laucks Testing Labs, Inc.
921 South Harney St
Seattle, WA 98108
Attn: Charlene Nix
- shipped VIA Federal Express
Airbill # 9276046754

*- Traffic Reports and Sample bottle information are contained in the back of notebook.

Joseph Muntangl 1/25/89 Kurt Kendler 1-30-89

Jim Allen

PEDNEAULT ASSOCIATES
TESTING LABS INC.
1615 NINTH AVENUE
BOHEMIA, N.Y. 11716
(516) 467-8477
(516) 567-5579

Oakville Drum Site 5-9-89 19
(Resampling)
02-8802-13

1000 - NUS Personnel arrive on site
- personnel on site are: written & photographic documentation
(J.M.) Joseph Murtaugh JM - S.M.
(D.H) Don Hessemer DH SSO
(T.V) Tom Varner - S.MO TAV
(R.P) Rick Pagano - Sampler RMP
(G.H.) Gerald Hannay - Sampler GH
- All personnel listed above have read and understood the workplan and QA/QC procedures.

other personnel on site:
- GAD TAWADROS - EPA (Edison) (observer)
- Jeff Gaal (JG) - EPA Fed Plaza (New York)
- Jim Allen - Pedneault Assoc (Representative for site owner)

weather: Sunny, warm 60°F
winds 0-2 mph from the Southeast

1020 - NUS personnel dressing up in PPE and preparing to decon equipment.
- safety Instruments to be used:
H-Nu - M EPA # 469749
(11.7 probe)
OVA - M EPA # 469734
Minirad 469735
- Checks - OK less than 20 CPM
1021 - Mr Tawardos leaves site to make phone calls.

Donald Hessemer 5/11/89 Joseph Murtaugh 5-9-89

Oakville Drum (Hika) 5-9-89 20
~~02~~-8803-13

S.C.B.A.'S to be used are
EPA #

Rich Pagano 307186 ~~192034~~ DH 5/10/89

Gerald Hannay ~~92035~~

Don ~~Hessemer - (backup)~~ DH 5/10/89 ~~307186~~
192034

- Cameras to be used are:

Print Film - Canon AE-1 307127

Slide Film - Chinon 469770

1025 - D.H. gives H&S meeting.

1030 - R.P. and G.H. begin decon'ing equipment.

1045 - Mr. Towardos back on site

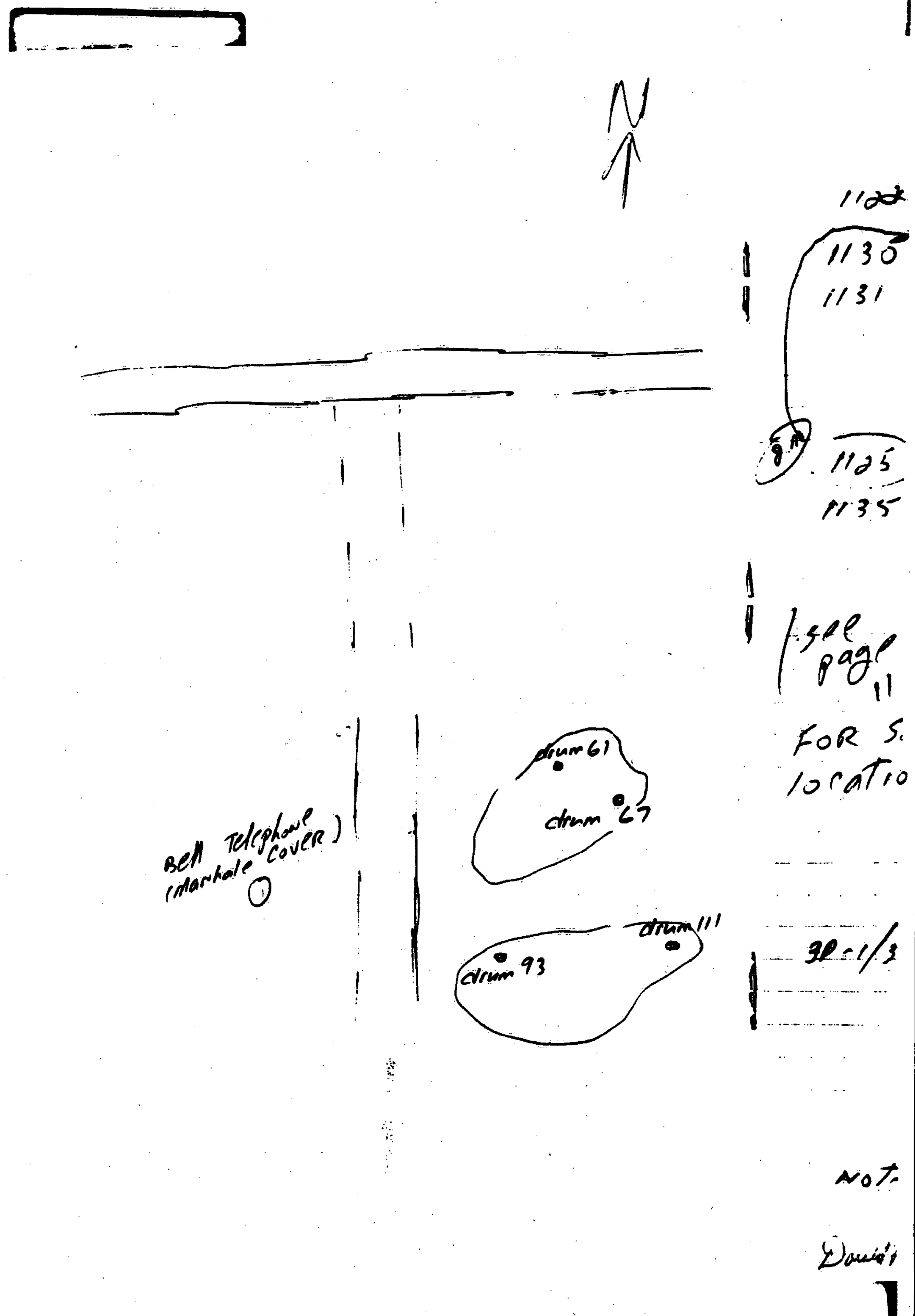
Note - we will be sampling at the same locations as the site investigation performed on 1/25/89

1115 - arrive at 1st drum cluster area.

1117 - setting up equipment for reconning drum cluster (1)

- NO reading A.B.G on H-NU or OVA in perimeter of drum area.

Donald P. Hessemer 5/11/89 ~~Joseph~~ Mustang 5.9.89


N
1122
1130
1131
9A
1125
1135
see page 11
FOR S.
locatio
drum 61
drum 67
Bell Telephone
(manhole cover)
drum 111
drum 93
30-1/3
NOT
David's

Oakville drum site 5-9-89 21
02-8802-13

1125 R.P. and G.H. ON AIR
D.H. on backup
1130 T.V. Collects NYEI-RIN 1 on a Trowel.
1131 R.P. and G.H. OFF AIR

No readings A.B.G. on H-NU
or OVA in 1st drum Cluster
pile 1

1125 T.V. ~~collects~~ prepares NYEI-TBLK
1135 Begin sampling at soil location
NYEI-S1 (MS/MSD)
- located at base of drum 67
(same location as NYEI-S1 during 1st sampling)
- Sample description

(see page 11 FOR sample location)

Reading of 3PPM on OVA
2 ppm on H-NU
directly in drum 67
~~- No readings in breathing zone or sampling AREA.~~

drum 111

~~30-1/35-1 - Photo of R.P. Sampling Soil Sample NYEI-S1~~
~~- sample depth from 0-6 inches~~
sample description!
loose Brown Silty F. sands
and a white flakey material.
Damp.

Note - we split samples with
Pedreault Assoc.
- we alternated jars during
sampling.

David J. Herman 5/11/89

5-9-89

Oakville drum site (Lilco) 5-9-89

02-3802-13

Note: The sample jars used by Pedneault assoc. are

40 ml vials - VOA analysis

12 oz mason jars / extractables

- The VOA vials were cleaned with a Hexane wash.

- Jim Allen didnt know about the mason jars.

1155 T.V. collects NYEI-Rin2 on a bowl.

1157 Finish Sampling NYEI-$1

Note: Mr. Towardos makes a request for everyone ~~to where~~ wear Hard hats.

~~- R.P and GH. change latex gloves~~

1202 - Begin sampling soil location S-2

- No readings ABG on H-nu or OVA.

Note! We are sampling at the base of drum # 61.

- The drum is still slightly leaking an oily material However staining is not as evident in the soil, although soil is hardened on the surface. Sample depth collected from 0-6 inches

3P2/SS-2 - Photo of GH sampling Soil sample NYEI-$2 at the base of drum 61

(see page 11 for sample location)

Donald P. Herman 5/11/89

5-9-89 Joseph Muntangh

Oakville drum site (Lilco) 5-9-89
00-8802-13

Sample description:

, Grayish Brown, loose to Dense, silty F-Sand. Tr. white powdery material, oily staining on surface. Damp.

1215 - No readings A.B.G. on the H-nu or OVA.

1220 - Begin Compositing Sample. G.H. notes an odor. Readings of 10 P.P.M on H-nu
" " 8 ppm on OVA
- No readings in breathing zone

1223 - Finish Taking Sample NYEI-02

1225 - Begin reconning 2nd pile of drums in 1st drum Cluster.

1231 - R.P. and G.H. on air.
- R.P and G.H. Change latex gloves.
- No readings A.B.G. on H-nu & OVA in outer ~~perimeter~~ of drum area.

1240 - Begin sampling Soil Sample NYEI-04 at the base of drum no. 111 ~~located~~

3R3/35-3 - Photo of R.P. collecting NYEI-04
- Readings of 5 PPM on H-nu drum 111

Daniel P. Kessm 5/11/89 5-9-89 ~~Daniel Martinez~~

Oakville drum site (Lilco) 5-9-89
02-8802-13

1245 R.P. and G.H. off air

- sample description

dk reddish brown, med dense, F-sands, moist

* - Oily viscous material present
- Sample collected at a depth of 0-6 inches
- sample location - located at base of drum 111
(see page 11 for location.)

Note - readings of 3 PPM on drum 93
, no readings in breathing zone.

1248 - Begin sampling soil sample S-3 located at base of drum 93

3A-4/35-4 - Photo of R.P. Sampling soil NYEI-S3

Note → R.P. and G.H changed latex gloves prior to collecting sample.

- No readings ABG on Hnu & OVA
- Sample collected at a depth of 0-6 inches
sample description:
loose, DK Grayish BR. silty F-sand, white flakey material, oily substance, Damp
- Photo of R.P. sampling NYEI-S3
- Sample location:
soil sample taken from base of drum 93 (1st cluster)
(see page 11 for location.)

1300 - Finished sampling in 1st drum cluster David Hamm 5/11/89 Joseph Mustang 5-9-89

Oakville drum Site (Lilco) 5-9-89
02-8802-13 25

1325 - drop samples off at setup area.

- Preparing to recon and sample The 2nd drum Cluster.
- (see page 14 for sample locations.)
- Clearing off sample bottles.

1335 - ARRIVE at Soil Sample location NYEI-07 / NYEI-06 located at base of drum # 7
(see page 14 for drum location in 2nd drum cluster)
- R.P and G.H. Change latex gloves.
- Sample description
V-loose, Pale brown f-sand. moist with a black oily staining on top.
- No readings ABG on H-nu or OVA.

985/355
1347 - Photo of R.P. collecting Soil sample NYEI-07 (Env.
986/356
1348 Soil Sample NYEI-06 (duplicate)
- sample collected at a depth of 0-6 inches

NOTE - New H-nu (E) EPA # 307142
Probe = 10.2 eV.

Donald P. Hesse 5/11/89
Joseph Montang 5-9-89

Oakville drum site (Lilco) 5.9-89
02-3302-13 26

1403 • arrive at soil sample S-5 location:

- located in 2rd drum cluster at base of drum 55. (see pg 14)

1405 - R.P. and G.H. on air

• Sample description:
- loose, C-M sands pale brown with black oily
3P-7/3S-7 staining moist.
1409 - Photo of R.P. Collecting Soil Sample S-5 at base of drum 55.
- Sample Collected at a depth of 0-6 inches
- Readings in drum
1000 ppm on OVA,
1000 ppm on H-nu

no readings in breathing zone

Note: • Honda Motorcycle Rider through Site area; MR. Kluncler - from East
license plate: 980SV Quogue
NEW YORK
1416 - R.P and G.H. off air.
1420 - finished sampling site
- no readings on sample jars.

Donald P. Herman 5/11/89 Joseph Mantangh 5-9-89

Oakville drum site (Lilco) 5-9-89
02-8802-13 27

1430 - arrive back at setup area to package samples and decon equipment.

1455 - J.M gives receipt for samples to Jim Allen - Consultant, Pedmanutt assoc.

1500 - Jim Allen leaves site.

1520 - Don Hessemer leaves site to call into office

1530 - Jeff Goal and Mr Tonardos leave site.

1545 - NUS personnel still packaging samples

1550 - D.H. arrives back on site

1600 - NUS personnel leave site

1640 - NUS personnel drop samples off at Federal Express

Donald P. Hessemer 5/11/89

5-9-89
Joseph Muntang

Oakville drum site (Liko)
Laboratory Information
Resampling.
Case No 11902
Organic Lab.

5-10-89

Century Laboratories, Inc.
1501 Grandview Ave.
Thorofare, New Jersey 08086
airbill No. for Soil Samples
7378008434

Airbill No. for Rinsates
and Trip blank
2738329646

5-10-89
[signature]

1/30/89 Oakville Drum Site (Lilco) 02-8802-13 1/30

Photolog - OFF site Reconnaissance

Photo #		Date/TIME	Photographer	Description	Photo
1P-1	✓	3/22/88 0930	Bob Nies	- view of access Rd to 1st drum Cluster	
1P-2	✓	0932	"	- view of access Rd to 2nd drum Cluster.	2P-2
1P-3	✓	0935	"		
1P-4	✓	0936	"	- VIEW of drums 1st Cluster/2nd Pile	2P-3
1P-5	✓	0937	"	- VIEW of drums 1st Cluster/1st Pile	2P-4
1P-6		0938	"	"	2P-5
1P-7		0939	"	- VIEW of drum 1st Cluster/2nd Pile	2P-6
1P-8		0940	"	"	2P-7
1P-9		0941	"	"	2P-8
1P-10	✓	0952	"	VIEW of drums 2nd Cluster/1st Pile	2P-9
1P-11	✓	1000	"	"	2P-10
1P-12	✓	1001	"	VIEW of drums 2nd Cluster/2nd Pile	2P-11
1P-13	✓	1002	"	"	
1P-14	✓	1003	"	"	2P-12
1P-15	✓	1004	"	VIEW of drums 2nd Cluster	
1P-16	✓	1005	"	"	2P-13
1P-17	✓	1010	"	"	
1P-18	✓	1015	"	VIEW of drums 2nd Cluster 3rd Pile	

[illegible] 1-30-89

* Photo TIMES are ~~[illegible]~~ Estimated. ~~Joseph~~ Mastangl 1/30/89

8802-13 1/30/89 Oakville Drum Site (Lilco) [redacted] 02-8802-13 40

Photolog - Site Investigation

Photo #	Date/Time	Photographer	Description
2P-2	1/25/89 1138	Joe Murtaugh	Dave Grupp Sampling Soil S-1
2P-3	1204	"	Dave Grupp Sampling Soil S-2
2P-4	1230	"	Dave Grupp Sampling Soil S-3
2P-5	1314	"	Al Latyn Sampling Soil S-6, S-7
2P-6	1320	"	resinous material beside drum on soil
2P-7	1350	"	Al Latyn Sampling Soil S-5
2P-8	1415	"	Dave Grupp Sampling Soil S-4
2P-9	1428	"	Photo of drum 111 showing gooey material
2P-10	1429	"	drum 111 from rear showing stained area
2P-11	1435	"	Photo of drum with name (~~MIEL DE ABEJAS~~ Bruta, Tara, Neto)
2P-12	1440	"	Photo of drum with name: Cyanamid
2P-13	1442	"	Photo of drum with name: PERMAG

Joseph Murtaugh
1/30/89

N
ss Rd Cluster
ss Rd Cluster
ums 2nd Pile
ums 1st Pile
um 2nd Pile
t Pile
d Pile
s
s
rd Pile
1/30/89
Bud Kendler 1-30-89

REFERENCE NO. 3

0028-C
02-8802-13

SUFFOLK COUNTY WATER AUTHORITY

Administrative Offices: OAKDALE, LONG ISLAND, NEW YORK 11769
Area Code 516-589-5200

WILLIAM J. SCHICKLER, P.E.
Chief Engineer

June 5, 1989

RECEIVED
JUN 8 REC'D
NUS CORPORATION
REGION II
SENT TO ____________

Mr. Michael Gentils
NUS Corp.
1090 King George's Post Road
Suite 1103
Edison, New Jersey 08837

Dear Mr. Gentils:

Enclosed please find copies of the maps you submitted, showing the location of the well fields within your areas of interest. The maps have been numbered for identification purposes so we can give you the well data you requested.

Information about Water Authority wells at these locations is as follows:

Map No.	Well Field & District	Well No.	Depth	Aquifer
1	Meeting House Rd. Westhampton	S-1345	46'	Glacial
		S-7383	47'	Glacial
		S-10328	47'	Glacial
		S-10733	58'	Glacial
		S-17577	58'	Glacial
		S-17576	56'	Glacial
		S-20686	55'	Glacial
		S-20687	55'	Glacial
		S-20688	78'	Glacial
		S-64716	50'	Glacial
		S-84517	53'	Glacial
	Spinney Road Westhampton	S-23184	118'-2"	Glacial
		S-53593	161'-8"	Glacial
2	Water Road Port Jefferson	S-20839	182'	Glacial
		S-20838	149'	Glacial
		S-44640	205'	Glacial
3	NONE			
4	Old Country Road Westhampton	S-16892	76'	Glacial
		S-16893	70'	Glacial
		S-65905	160'-8"	Glacial

5	Lambert Avenue Westhampton	S-71881 S-71882	308'-10" 318'-2"	Magothy Magothy
	Margin Drive Westhampton	S-18729 S-52943	356' 110'	Magothy Glacial

We have also included an exhibit titled "Suffolk County Water Authority-Service Areas and Location of Production and Storage Facilities". You can use this exhibit to determine whether any other water suppliers are in your areas of interest.

The Suffolk County Water Authority system is completely interconnected in these areas and the population served by individual wells is not available. The estimated population of the districts noted, as of May 31, 1987, is as follows; Westhampton - 39,500 and Port Jefferson - 126,000.

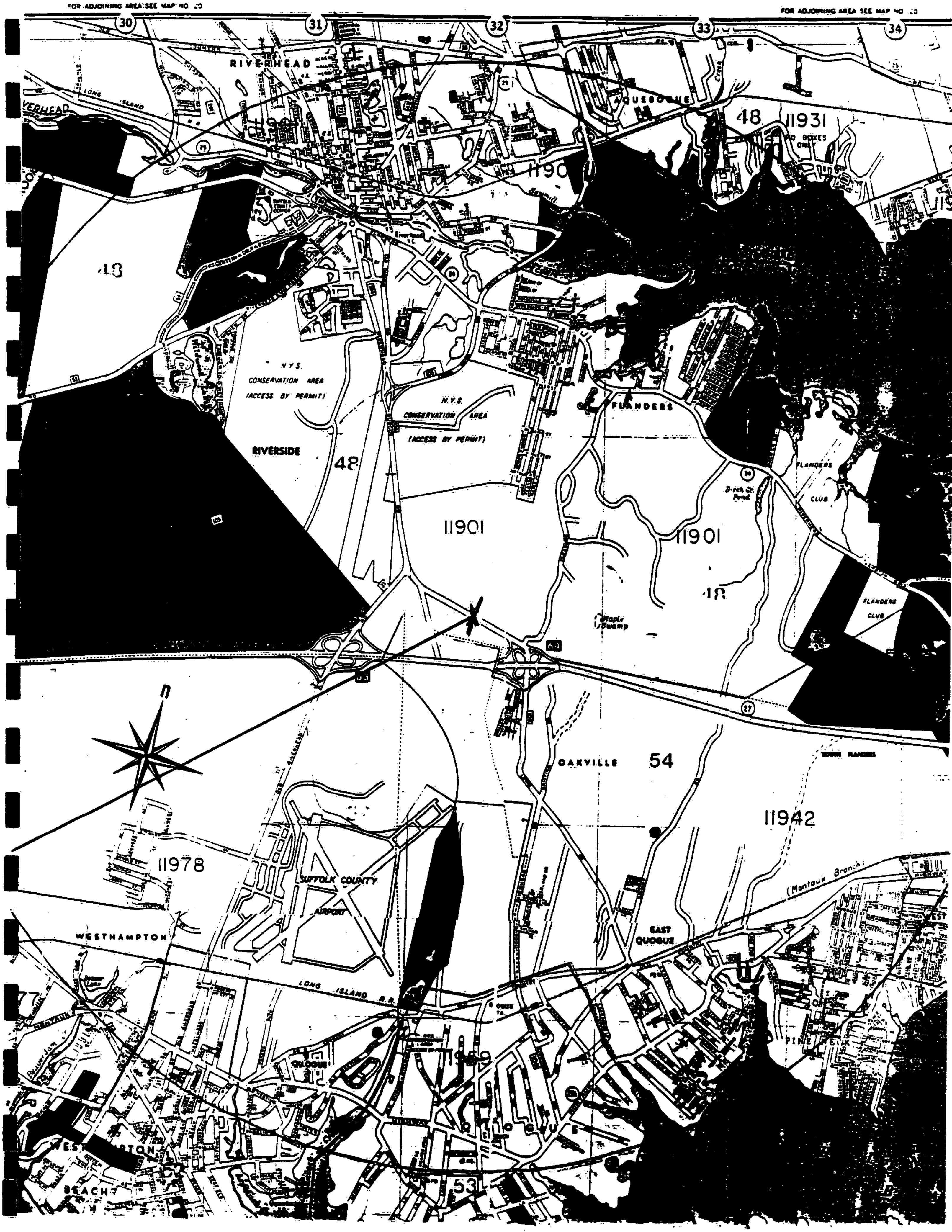
If you have further questions, please advise.

Very truly yours,

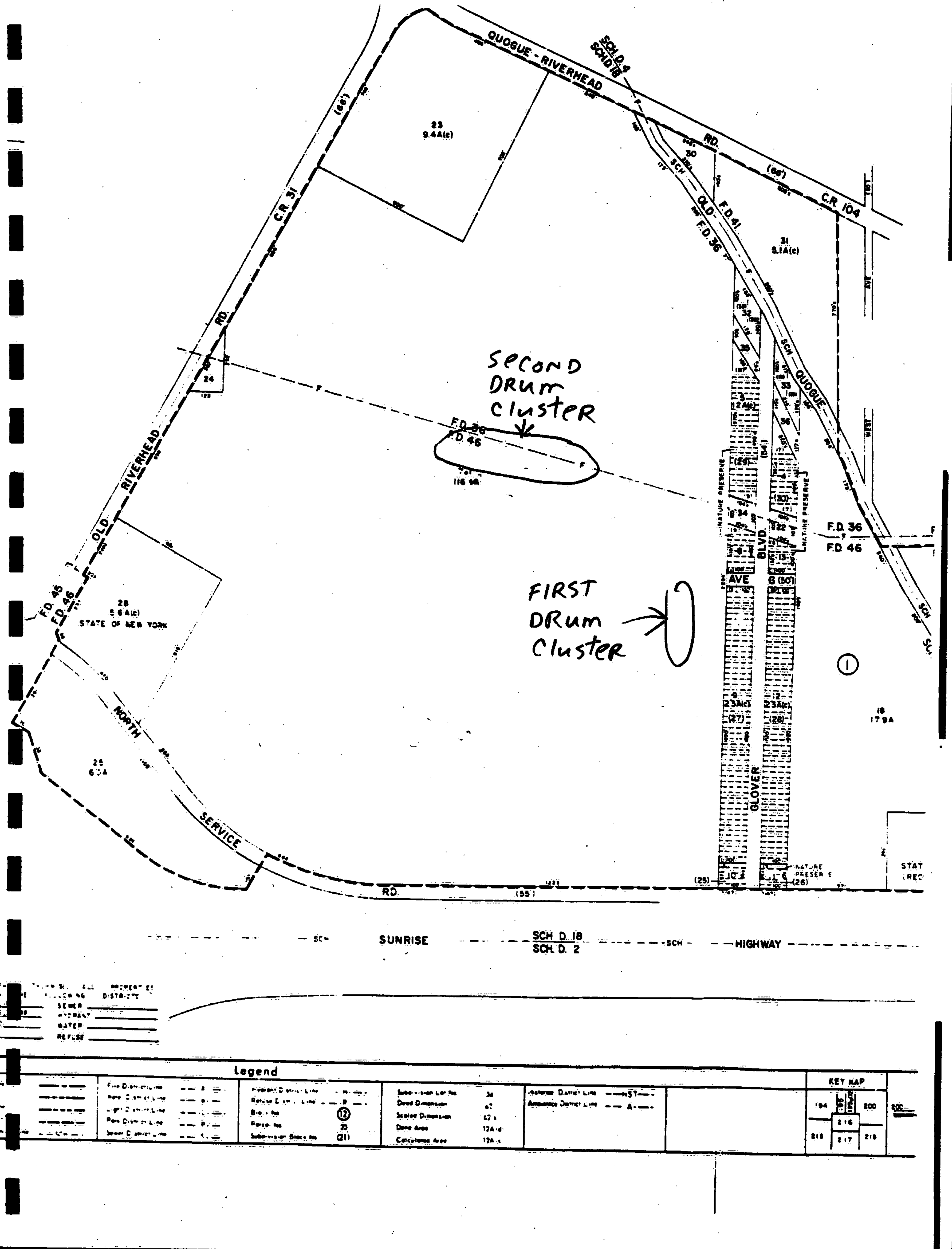
W. J. Schickler, P.E.
Chief Engineer

WJS:SRD:DMR

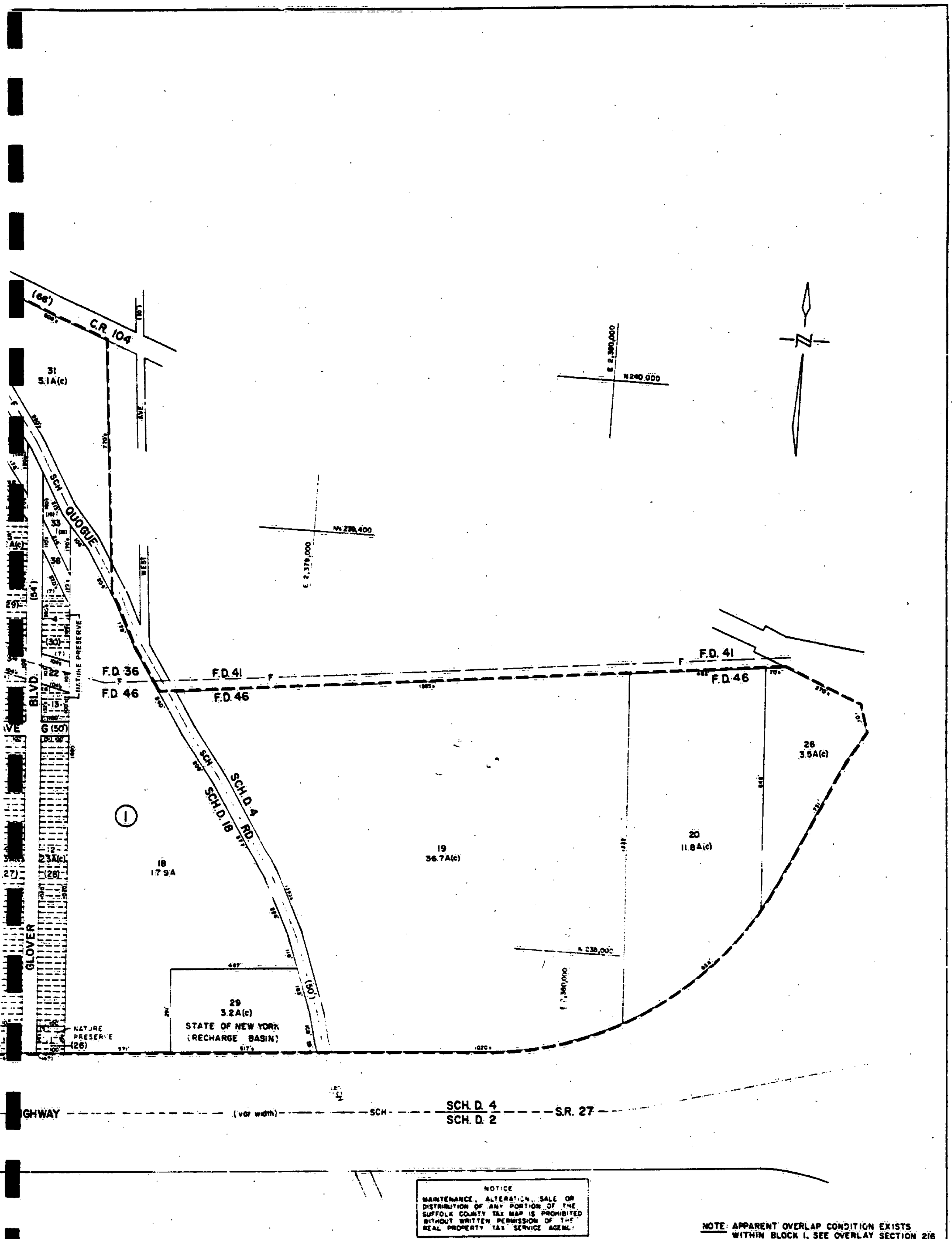
FOR ADJOINING AREA SEE MAP NO. 20
FOR ADJOINING AREA SEE MAP NO. 20



REFERENCE NO. 4



QUOGUE - RIVERHEAD RD.
C.R. 104
SCH D. 4
SCH D. 18
OLD RIVERHEAD RD.
C.R. 31
23
9.4A(c)
24
31
5.1A(c)
OLD QUOGUE
F.D. 41
F.D. 36
SCH
SECOND DRUM CLUSTER
F.D. 36
F.D. 46
116.9A
FIRST DRUM CLUSTER
NATURE PRESERVE
BLVD
AVE
GLOVER BLVD
WEST AVE
1
18
17.9A
28
5.6A(c)
STATE OF NEW YORK
F.D. 45
F.D. 46
NORTH SERVICE RD.
25
6.3A
SUNRISE HIGHWAY
SCH D. 18
SCH. D. 2
SEWER
HYDRANT
WATER
REFUSE
Legend
KEY MAP



KEY MAP 194 195 200 216

SCALE IN FEET 200 0 200 400

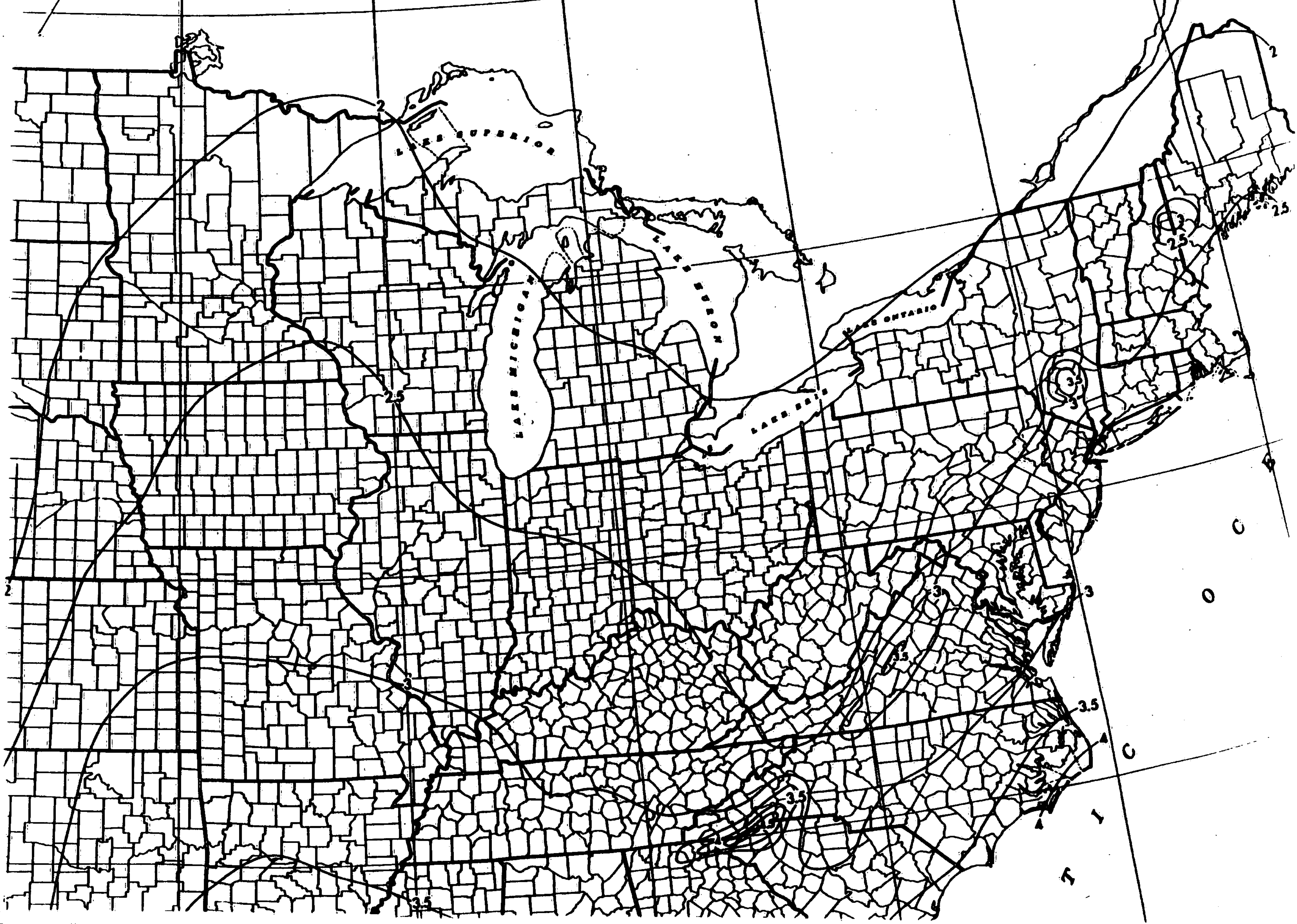
© COUNTY OF SUFFOLK
Real Property Tax Service Agency
County Center

TOWN OF SOUTHAMPTON
VILLAGE OF
DISTRICT NO. 0900

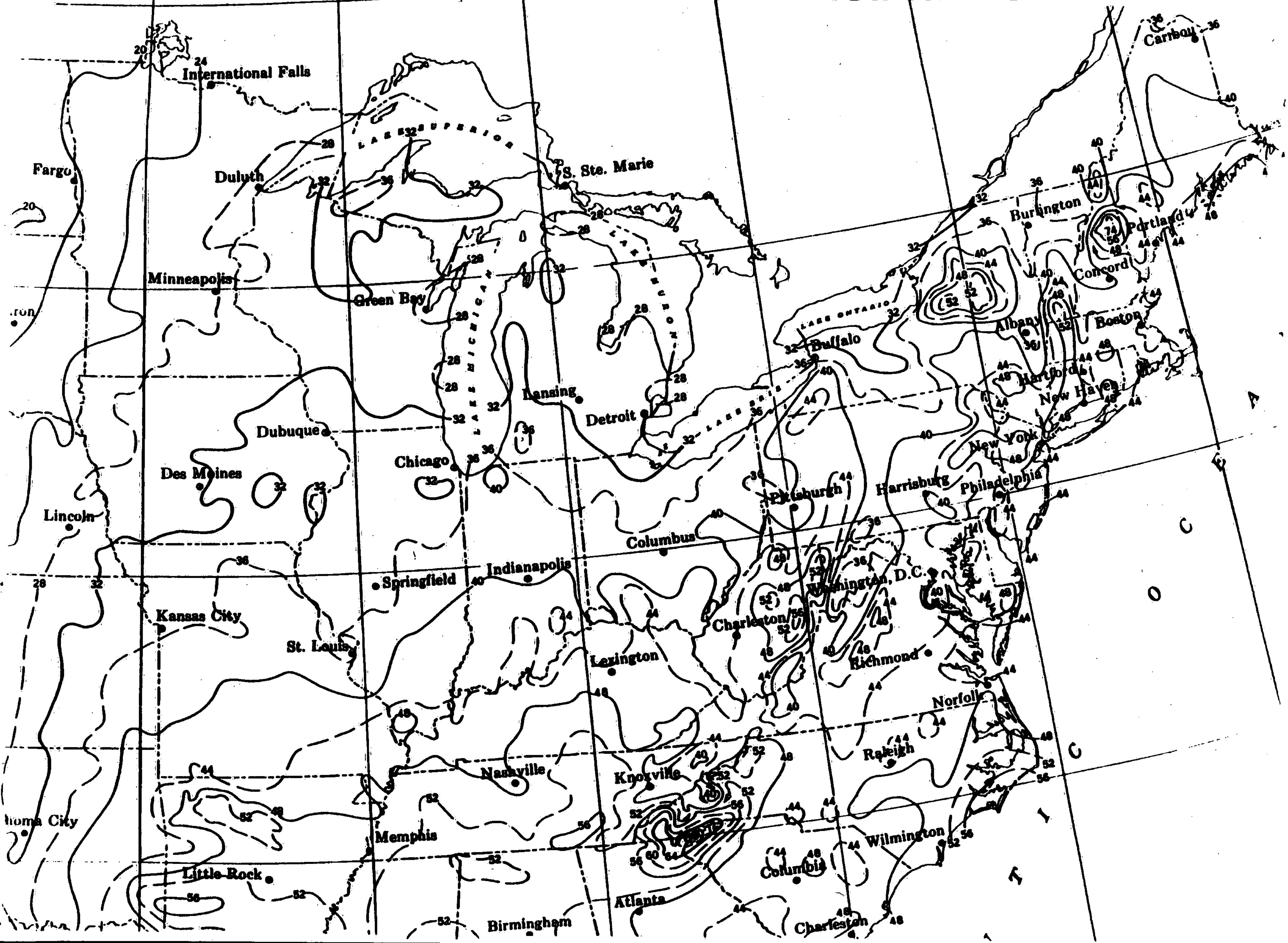
SECTION NO
216

REFERENCE NO. 5

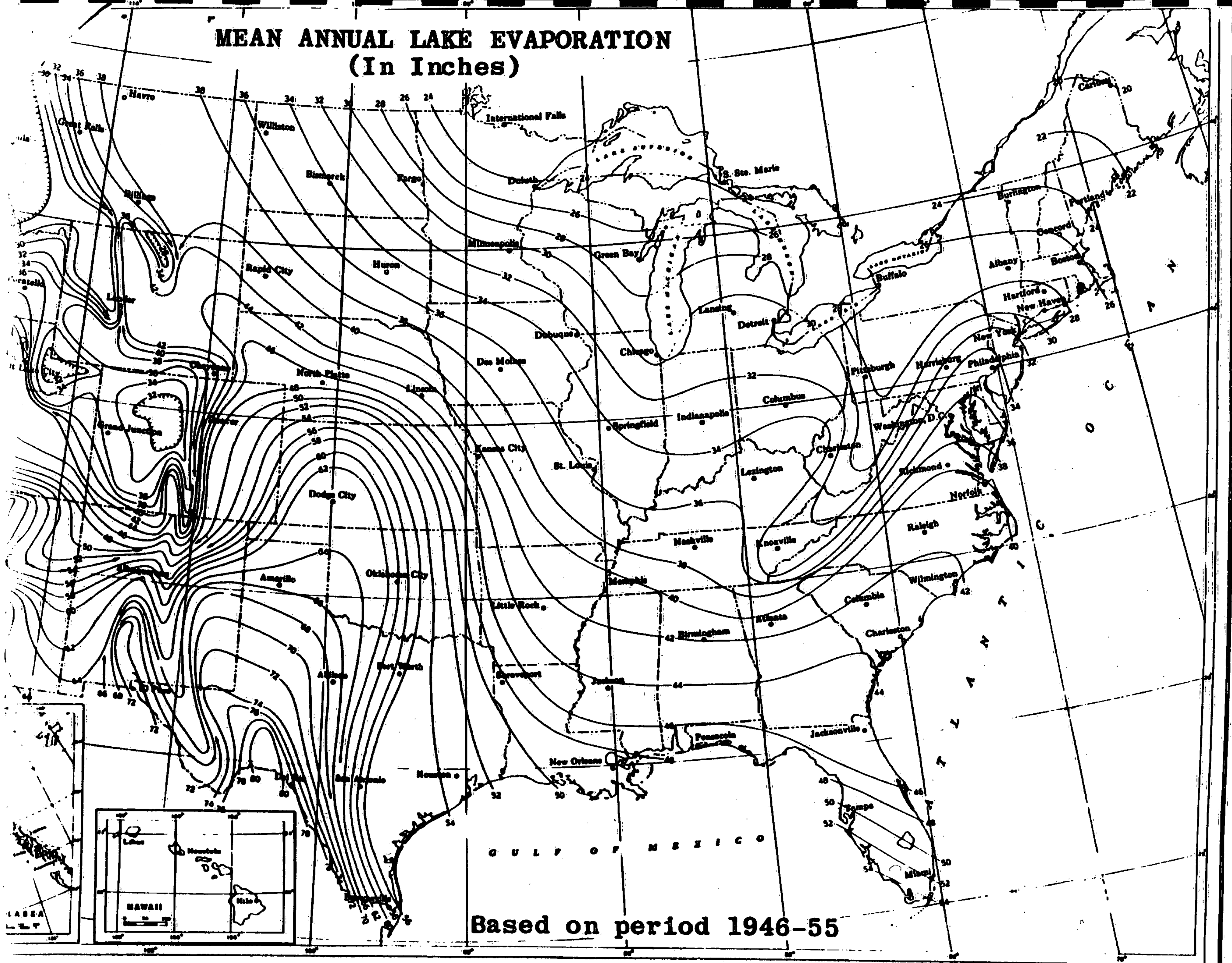
1 YEAR 24-HOUR RAINFALL (inches)



NORMAL ANNUAL TOTAL PRECIPITATION (Inches)



MEAN ANNUAL LAKE EVAPORATION
(In Inches)



Based on period 1946-55

REFERENCE NO. 6

DEC 27 REC'D

NUS CORPORATION
REGION II
SENT TO ______________

Don
FYI
Give me A call

ESSEKS, HEFTER & ANGEL
COUNSELORS AT LAW
108 EAST MAIN STREET
P.O. BOX 279
RIVERHEAD, N.Y. 11901
(516) 369-1700
TELEX-EHCA 6852318 UW
TELECOPIER NUMBER (516) 369-2065

WILLIAM W. ESSEKS
MARCIA Z. HEFTER
STEPHEN R. ANGEL

JANE ANN R. KRATZ
JOHN M. WAGNER
WILLIAM POWER MALONEY

WATER MILL OFFICE
MONTAUK HIGHWAY
P.O. BOX 570
WATER MILL, N.Y. 11976
(516) 726-6633

ALAN D. OSHRIN
OF COUNSEL

December 9, 1988

Mr. Jeff Gaal
U.S. Environmental Protection Agency
26 Federal Plaza
Room 2230
New York, NY 10278

Dear Mr. Gaal:

Flanders Associates is the current owner of lands lying north of State Route 27 and east of County Road 31 in the Town of Southampton. From previous correspondence directed to me from NUS Corporation, we believe part of the Flanders Associates property is considered to be included in the "Oakville Drum Site - LILCO, EPA ID Number NYD981186893".

Flanders Associates engaged Pednault Associates, Inc. to evaluate the drums on the Flanders Associates property and to propose a method of removal. Pednault Associates reports the drums to contain "a mixture of waste products (approximately twenty empty drums), such as tar, asphalt, and waste stillbottoms." They further advise that the drums can be removed and disposed of at a cost of $260.00 per drum. Copies of the Pednault Associates analysis of the material and correspondence regarding the cost of disposal are enclosed.

Flanders Associates is concerned that the continued presence of the drums on the property poses a threat of release of the contents to the underlying soil, and desires to have the drums and their contents removed immediately. Flanders Associates wish to accomplish the removal without violation of any law or regulation. Accordingly, this letter is intended to serve notice of Flanders Associates' intention to cause the drums to be removed and delivered into the custody of Pednault Associates, Inc. for proper disposal. If your agency objects to this course of action or is aware of any reason why the removal should not be carried out immediately, you are requested to advise Flanders Associates in writing on or before December 30, 1988.

Very truly yours,

W. W. E.

William W. Esseks

Certified/Return Receipt

PEDNEAULT ASSOCIATES, INC. TESTING LABORATORIES
1615 NINTH AVENUE · P.O. BOX 205 · BOHEMIA, N.Y. 11716 · (516) 467-8477
AFTER 5 P.M. (516) 567-5579

November 16, 1988

Flanders Associates
c/o SMA Incorporated
300 Wheeler Road
Room 106
Hauppauge, NY 11788

Attention: Sina Mahfar

Dear Mr. Mahfar:

We have investigated the drums of unknown material on your property at Route 104 and Sunrise Highway, Flanders, New York.

There appears to be sixty drums that have been there quite a while. The drums are numbered with spray paint indicating that they have been surveyed in the past, but apparently no action was taken.

The drums contain a mixture of waste products (approximately twenty empty drums), such as, tar, asphalt, and waste stillbottoms.

We feel that they can be disposed of at a reasonable price, and have made some inquiries on your behalf to facilitate this. $260.00 per drum seems to be the best price we can get, and can be done almost immediately.

If I can be of any further assistance to you, please do not hesitate to call me.

Sincerely,

J. Pedneault

John Pedneault
Laboratory Director

JP/jlm

PEDNEAULT ASSOCIATES, INC. TESTING LABORATORIES
1615 NINTH AVENUE · P.O. BOX 205 · BOHEMIA, N.Y. 11716 · (516) 467-8477
AFTER 5 P.M. (516) 567-5579

November 23, 1988

TO: Flanders Associates
c/o SMA Incorporated
300 Wheeler Road
Room 106
Hauppauge, NY 11788

Date: Collected 11/9/88 Analyzed 11/9-11/22/88 Report 11/23/88

Sampling Point

1. Unknown Sample brougt in by client. (EP Toxicity for Heavy Metals)
2.
3.
4.
5.

Parameters		1	2	3	4	5
Arsenic	mg/ℓ	<0.01				
Barium	mg/ℓ	<0.05				
Cadmium	mg/ℓ	0.002				
Chromium	mg/ℓ	0.093				
Silver	mg/ℓ	<0.02				
Lead	mg/ℓ	<0.01				
Mercury	mg/ℓ	<0.001				
Selenium	mg/ℓ	<0.01				
Flash Point	°C	>100°				

Lab Number 49831

jm

JOHN PEDNEAULT
Lab Director

REFERENCE NO. 7

NUS CORPORATION

TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8802-13 02-8802-15	3-21-88	1345

DISTRIBUTION:

$I FILE

BETWEEN:	OF:	PHONE:
Cecil Johnson	Albany DEC	(518) 457-0747

AND:

Michael Gentile (NUS)

DISCUSSION:

I had discovered from Rebecca Ligotino from EA Sciences That the Main Office in Albany (DEC) had taken samples sometime last year. I reached Cecil Johnson from the DEC and he said that they took drum samples on 9-15-87 and the results showed problems with PCB's + Pesticides. The high concentrations were due to a lab error. Cecil informed me that he was in the process of talking to his supervisor about the results and if I wanted to call him in a few days he would tell me what they decided.

Michael N. Gentile
3/21/88

ACTION ITEMS:

NUS 087 REVISED 0581

REFERENCE NO. 8

GEMS> I

OAKVILLE DRUM SITE (LILCO)
LATITUDE 40:52:50 LONGITUDE 72:38: 5 1980 POPULATION

KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	0	0	0	4480	1884	8885	15249
RING TOTALS	0	0	0	4480	1884	8885	15249

GEMS> I

OAKVILLE DRUM SITE (LILCO)
LATITUDE 40:52:50 LONGITUDE 72:38: 5 1980 HOUSING

KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	0	0	0	1684	618	3265	5567
RING TOTALS	0	0	0	1684	618	3265	5567

Distance (miles	Population	Houses
0.25	0	0
0.50	0	0
1	0	0
2	4480	1684
3	6364	2302
4	15,249	5567

REFERENCE NO. 9

FEB 21 1989

rec'd 2/23

Oakville Drumsite

From: Vince Pitruzello, Chief
Program Support Branch

To: Richard D. Spear, Chief
Surviellance and Monitoring Branch

This is to inform you of ERRDs actions concerning the Oakville Drum Site (LILCO) in Suffolk County, NY. Your letter dated February 1, 1989, referred the FIT's concerns over the condition of the approximately 114 drums located at this site. Jeff Gaal has forwarded all of the available information to Mr. James Doyle (Office of Regional Counsel) who was involved in obtaining the site access for FIT. Mr. Doyle is currently working with the NY/Caribbean Compliance Branch and the Removal Action Branch to coordinate the appropriate response action. If any questions should arise regarding this site please contact Jeff Gaal at x6668.

cc: Darvene Adams, SMB
Amy Brochu, SMB

REFERENCE NO. 10

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

TO Lou Bev. - 4/28 - with data package attached

DATE: APR 28 1989

SUBJECT: Return of Non-Useable Organics Data Package for Oakville Drum Site - Case #11290

FROM: Darvene A. Adams, Chief
Superfund Support Section

TO: Lou Bevilacqua, Chief
Toxic and Hazardous Waste Section

As the attached letter from FIT's Pamela Greenlaw indicates, we are returning the organics data package on Oakville Drum Site, CLP Case #11290. As the data received from Revet Environmental and Analytical Labs could not be validated, the package is useless to us and, as a result, it is now necessary for FIT to resample the site for organics in early May. The entire organics package is being returned unused (i.e., it will not be cited in FIT's report) and we are recommending that Revet Labs not be paid for their services.

Details on why the package could not be validated or salvaged are given in Pam's letter. If you should have any questions or comments, please give me a call at x6700.

Attachment

cc: A. Brochu - SMB
R. Naman - FIT
P. Greenlaw - FIT
Jeff Gaal - ERRD

✓ 4/28

NUS CORPORATION
1090 KING GEORGES POST ROAD
SUITE 1103
EDISON, NEW JERSEY 08837
201-225-6160

C-584-04-89-153

April 27, 1989

RECEIVED
APR 28 1989
S & M BRANCH

Ms. Amy Brochu
U.S. Environmental Protection Agency
Region 2
Edison, New Jersey 08837

Re: Oakville Drum Site Identification No. NYEISI
Organic data review
Revet Environmental and Analytical Laboratories Inc.

Dear Amy:

As per our unsuccessful data salvage meeting on April 24, the Oakville Drum Site Organic data is being returned. All attempts to validate the data were unsuccessful. EPA-MMB and ESAT reviewers were also unable to validate the data. The laboratory was contacted on March 22 but was unable or unwilling to rectify the discrepancies and/or misinterpretations. Several of the problems were associated with calculations and may be contract interpretation problems rather than actual errors. However the calculations were not performed using the contract guidelines and are considered non-compliant.

Some of the errors are as follows:

VOA:

- Surrogate recoveries were outside contract required QC limits for samples BZ751,753,755,756,757,751,RE, 753RE,755RE,756RE,757RE.
- Internal standard areas were outside contract required QC limits for samples BZ751,753,755,756,757,753RE,755RE,756RE,757RE.
- Medium level CRQL's and quantitations were not calculated as per contact which made validation impossible.

BNA:

- Holding times were exceeded for medium level extractions. According to the case narrative the lab was unable to extract using low level protocol but didn't bother to extract as medium level samples until one month later. The traffic report mentions high OVA/HNu readings on two samples indicating that they may not be low level samples.
- No surrogate recoveries were obtained for sample BZ754
- Medium level CRQL's and quantitations were not calculated as per contract which made validation impossible.

C-584-04-89-153

Amy Brochu
U.S. Environmental Protection Agency
April 26 1989 Page - Two

Pesticide/PCB's:

- CRQL's are inconsistent - occasionally correct. Example - BZ752 and 752 DL list same CRQL's
- Quantitations are not confirmable by reviewer and no response from lab.
- Lab inserted "made-up" numbers in order to make off-scale values work in the computer generated calculations. No corrections were present on form 1's or explanations found in case narrative.

For these reasons these data can not be accepted as valid data.

Very truly yours,

Pamela Greenlaw

Pamela Greenlaw

Reviewed and Approved: Ron Naman

PG/kac

REFERENCE NO. 11

SITE NAME: OAKVILLE DRUM SITE (LILCO)
TDD#: 02-8802-13
SAMPLING DATE: 5/9/89
EPA CASE NO.: 11902 LAB: CENTURY

VOLATILES										
Sample ID No.	NYEI-S1(MS/MSD)	NYEI-S2	NYEI-S3	NYEI-S4	NYEI-S5	NYEI-S6	NYEI-S7(DUP)	NYEI-RIN1(MS/MSD)	NYEI-RIN2	NYEI-TBLK1
Traffic Report No.	BAH08	BAH09	BAH10	BAH12	BAH13	BAH14	BAH15	BAH16	BAH17	BAH18
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	WATER	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1	1	1
Percent Moisture	10	16	18	43	17	5	8	---	---	---
Chloromethane										
Bromomethane								R	R	R
Vinyl Chloride										
Chloroethane										
Methylene Chloride	100 E	54 E	22 E		21	120 E	120 E			
Acetone	64 E				28		25 E			
Carbon Disulfide										
1,1-Dichloroethene										
1,1-Dichloroethane										
Trans-1,2-Dichloroethene (total)										
Chloroform										
1,2-Dichloroethane										
2-Butanone	R	R	R	R	R	R	R	R	R	R
1,1,1-Trichloroethane										
Carbon Tetrachloride					J					
Vinyl Acetate										
Bromodichloromethane										
1,2-Dichloropropane										
cis-1,3-Dichloropropene										
Trichloroethene										
Dibromochloromethane										
1,1,2-Trichloroethane										
Benzene										
trans-1,3-Dichloropropene										
Bromoform										
4-Methyl-2-Pentanone										
2-Hexanone										
Tetrachloroethene										
Toluene						9 E				
1,1,2,2-Tetrachloroethane										
Chlorobenzene										
Ethylbenzene										
Styrene										
Xylenes (Total)				6600 E						

NOTES:
Blank space - compound analyzed for but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - Presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor >1 and/or percent moisture >0%

SITE NAME: OAKVILLE DRUM SITE (LILCO)
TDD#: 02-8802-13
SAMPLING DATE: 5/9/89
EPA CASE NO.: 11902 LAB: CENTURY

SEMI-VOLATILES										
Sample ID No.	NYEI-S1(MS/MSD)	NYEI-S2	NYEI-S3	NYEI-S4	NYEI-S5	NYEI-S6	NYEI-S7(DUP)	NYEI-AIN1(MS/MSD)	NYEI-AIN2	NYEI-TBLK1
Traffic Report No.	BAH08	BAH09	BAH10	BAH12	BAH13	BAH14	BAH15	BAH16	BAH17	BAH18
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	WATER	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L
Dilution Factor/GPC Cleanup (Y)	6	4	1	20	6	6	6	1	1	N/A
Percent Moisture	10	16	18	43	17	5	8	—	—	N/A
Phenol										NR
bis(2-Chloroethyl)ether										NR
2-Chlorophenol										NR
1,3-Dichlorobenzene										NR
1,4-Dichlorobenzene										NR
Benzyl alcohol										NR
1,2-Dichlorobenzene										NR
2-Methylphenol										NR
bis(2-Chloroisopropyl)ether										NR
4-Methylphenol										NR
N-Nitroso-di-n-dipropylamine										NR
Hexachloroethane										NR
Nitrobenzene										NR
Isophorone										NR
2-Nitrophenol										NR
2,4-Dimethylphenol										NR
Benzoic acid	J				J					NR
bis(2-Chloroethoxy)methane										NR
2,4-Dichlorophenol										NR
1,2,4-Trichlorobenzene										NR
Naphthalene			J	J						NR
4-Chloroaniline										NR
Hexachlorobutadiene										NR
4-Chloro-3-Methylphenol										NR
2-Methylnaphthalene				J						NR
Hexachlorocyclopentadiene										NR
2,4,6-Trichlorophenol										NR
2,4,5-Trichlorophenol										NR
2-Chloronaphthalene										NR
2-Nitroaniline										NR
Dimethylphthalate										NR
Acenaphthylene										NR
2,6-Dinitrotoluene										NR
3-Nitroaniline										NR
Acenaphthene										NR
2,4-Dinitrophenol										NR
4-Nitrophenol	R									NR
Dibenzofuran										NR
2,4-Dinitrotoluene										NR
Diethylphthalate										NR
4-Chlorophenyl-phenyl ether										NR
Fluorene										NR
4-Nitroaniline										NR
4,6-Dinitro-2-methylphenol										NR
N-nitrosodiphenylamine										NR
4-Bromophenyl-phenyl ether										NR
Hexachlorobenzene										NR

SITE NAME: OAKVILLE DRUM SITE (LILCO)
TDD#: 02-8802-13
SAMPLING DATE: 5/9/89
EPA CASE NO.: 11902 LAB: CENTURY

SEMI-VOLATILES										
Sample ID No.	NYEI-S1(MS/MSD)	NYEI-S2	NYEI-S3	NYEI-S4	NYEI-S5	NYEI-S6	NYEI-S7(DUP)	NYEI-RIN1(MS/MSD)	NYEI-RIN2	NYEI-TBLK1
Traffic Report No.	BAH08	BAH09	BAH10	BAH12	BAH13	BAH14	BAH15	BAH16	BAH17	BAH18
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	WATER	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L
Dilution Factor/GPC Cleanup (Y)	6	4	1	20	6	6	6	1	1	N/A
Percent Moisture	10	16	18	43	17	5	8	—	—	N/A
Pentachlorophenol										NR
Phenanthrene										NR
Anthracene										NR
Di-n-butylphthalate										NR
Fluoranthene									J	NR
Pyrene										NR
Butylbenzylphthalate										NR
3,3'-Dichlorobenzidine										NR
Benzo(a)anthracene										NR
Chrysene										NR
bis(2-Ethylhexyl)phthalate										NR
Di-n-octylphthalate									J	NR
Benzo(b)fluoranthene										NR
Benzo(k)fluoranthene										NR
Benzo(a)pyrene										NR
Indeno(1,2,3-cd)pyrene										NR
Dibenz(a,h)anthracene										NR
Benzo(g,h,i)perylene										NR

NOTES:
Blank space - compound analyzed for but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - Presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor >1 and/or percent moisture >0%

SITE NAME: OAKVILLE DRUM SITE (LILCO)
TDD#: 02-8802-13
SAMPLING DATE: 5/9/89
EPA CASE NO.: 11902 LAB: CENTURY

PESTICIDES										
Sample ID No.	NYEI-S1(MS/MSD)	NYEI-S2	NYEI-S3	NYEI-S4	NYEI-S5	NYEI-S6	NYEI-S7(DUP)	NYEI-RIN1(MS/MSD)	NYEI-RIN2	NYEI-TBLK1
Traffic Report No.	BAH08	BAH09	BAH10	BAH12	BAH13	BAH14	BAH15	BAH16	BAH17	BAH18
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	WATER	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L
Dilution Factor/GPC Cleanup (Y)	1	1	1	1	1	1	1	1	1	N/A
Percent Moisture	10	16	18	43	17	5	8	---	---	N/A
alpha-BHC										NR
beta-BHC										NR
delta-BHC										NR
gamma-BHC (Lindane)				J						NR
Heptachlor										NR
Aldrin		200		J						NR
Heptachlor epoxide										NR
Endosulfan I										NR
Dieldrin		J								NR
4,4'-DDE										NR
Endrin										NR
Endosulfan II										NR
4,4'-DDD										NR
Endosulfan sulfate										NR
4,4'-DDT									J	NR
Methoxychlor										NR
Endrin ketone										NR
alpha-Chlordane										NR
gamma-Chlordane										NR
Toxaphene										NR
Aroclor-1016										NR
Aroclor-1221										NR
Aroclor-1232										NR
Aroclor-1242										NR
Aroclor-1248										NR
Aroclor-1254										NR
Aroclor-1260										NR

NOTES:
Blank space - compound analyzed for but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - Presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor >1 and/or percent moisture >10%

SITE NAME: OAKVILLE DRUM (LILCO)
TDD#: 02-8802-13
SAMPLING DATE: ~~05/08/88~~ 01/25/89
EPA CASE NO.: 11290
LAB NAME: LAUCKS

INORGANICS Sample ID No.	NYEI-S1(MS/MSD)	NYEI-S2	NYEI-S3	NYEI-S4	NYEI-S5	NYEI-S6	NYEI-S7(DUP)	NYEI-RIN1(MS/MSD)	NYEI-RIN2(MS/MSD)	NYEI-TBLK1
Traffic Report No.	MBX451	MBX452	MBX453	MBX454	MBX455	MBX456	MBX457	N/A	MBX458	N/A
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	N/A	WATER	N/A
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L	ug/L	ug/L
Aluminum	987	674	725	282	2490	384	360	NR		NR
Antimony								NR		NR
Arsenic	R	R	R	R	R	R	R	NR		NR
Barium	J	J			J	49.3	49.5	NR		NR
Beryllium				J	J			NR		NR
Cadmium								NR		NR
Calcium	52700	1950	J	J	J	J	J	NR	J	NR
Chromium	2.8 E	3.7 E	1.8		17.1	J	J	NR		NR
Cobalt	J							NR	J	NR
Copper	8.1 E	6.9 E	6 E	J	114 E	34.8 E	27.7 E	NR	J	NR
Iron	3160	22000	5100	4080	6300	16200	16500	NR		NR
Lead	47.1	35.7 E	31.8 E	15.2	72.3 E	721 E	579 E	NR		NR
Magnesium	J	J	J	J	J	J	J	NR		NR
Manganese	77.6 E	115 E	26.6 E	23.9 E	20.3 E	70.6 E	74.8 E	NR		NR
Mercury								NR		NR
Nickel		9.4						NR		NR
Potassium								NR		NR
Selenium								NR		NR
Silver								NR		NR
Sodium	J	J	J	J	J	1560	1490	NR		NR
Thallium								NR		NR
Vanadium	J	J	J		32 E		J	NR		NR
Zinc	R	84.6	R	R	51.5	64.4	R	NR	46.9	NR

NOTES:
Blank space - compound analyzed for but not detected
E - estimated value
J - estimated value, compound present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

02-8802-13-STR
Rev. No. 0

SAMPLING TRIP REPORT

SITE NAME: Oakville Drum Site (LILCO)

TDD NO.: 02-8802-13 /NYEI

SAMPLING DATE: January 25, 1989

EPA CASE NO: 11290

TCINYEI - SS generated

TCONYEI

STR1+STR entered awaiting data

1. Site Location: Refer to Figure 1
2. Sample Locations: Refer to Figure 2
3. Sample Descriptions: Refer to Table 1
4. Laboratories Receiving Samples:

Sample Type	Name and Address of Laboratory
Organic	Revet Environmental and Analytical Lab 365 Plantation St. Worchester, MA 01605
Inorganic	Laucks Testing Labs, Inc. 921 South Harney St. Seattle, WA 98108

LAUCKS inorg printed out

5. Sample Dispatch Data:

A total of three aqueous and seven soil samples for organic analysis were shipped by FIT 2 personnel via Federal Express under Airbill No. 2738328051 to Revet Environmental and Analytical Lab on January 25, 1989 at 1600 hours.

A total of one aqueous and seven soil samples for inorganic analysis were shipped by FIT 2 personnel via Federal Express under Airbill No. 9276046754 to Laucks Testing Labs, Inc. on January 25, 1989 at 1600 hours.

6. Sampling Personnel:

Name	Organization	Duties on Site
Joseph Murtaugh	NUS Corporation, FIT 2	Site Manager, Written and Photographic Documentation
Richard Lorfing	NUS Corporation, FIT 2	Site Safety Officer
Mark Ellis	NUS Corporation, FIT 2	Sample Management Officer
Dave Grupp	NUS Corporation, FIT 2	Sampler
Al Latyn	NUS Corporation, FIT 2	Sampler

7. Weather Conditions:

   45°F, clear, sunny, winds from the northwest at 10 mph.

8. Additional Comments:

   All samples, except for a trip blank and two rinsate blanks, will be analyzed for Target Compound List (TCL) organic compounds and TCL total metals. The trip blank and Rinsate 1 will be analyzed for volatile organic compounds only, and Rinsate 2 will be analyzed for TCL extractables and TCL total metals.

10. Report Prepared By: Joseph Murtaugh   Date: January 31, 1989

11. Approved By: T Mil   Date: 2/2/89

~~~~ 02-8802-13

SAMPLING TRIP REPORT

SITE NAME:	Oakville Drum Site (LILCO)
TDD NO.:	02-8802-13
SAMPLING DATE:	May 9, 1989
EPA CASE NO:	11902

1. Site Location: Refer to Figure 1
2. Sample Locations: Refer to Figure 2
3. Sample Descriptions: Refer to Table 1
4. Laboratories Receiving Samples:

Sample Type	Name and Address of Laboratory
Organic	Century Laboratories, Incorporated 1501 Grandview Avenue Thorofare, New Jersey 08086

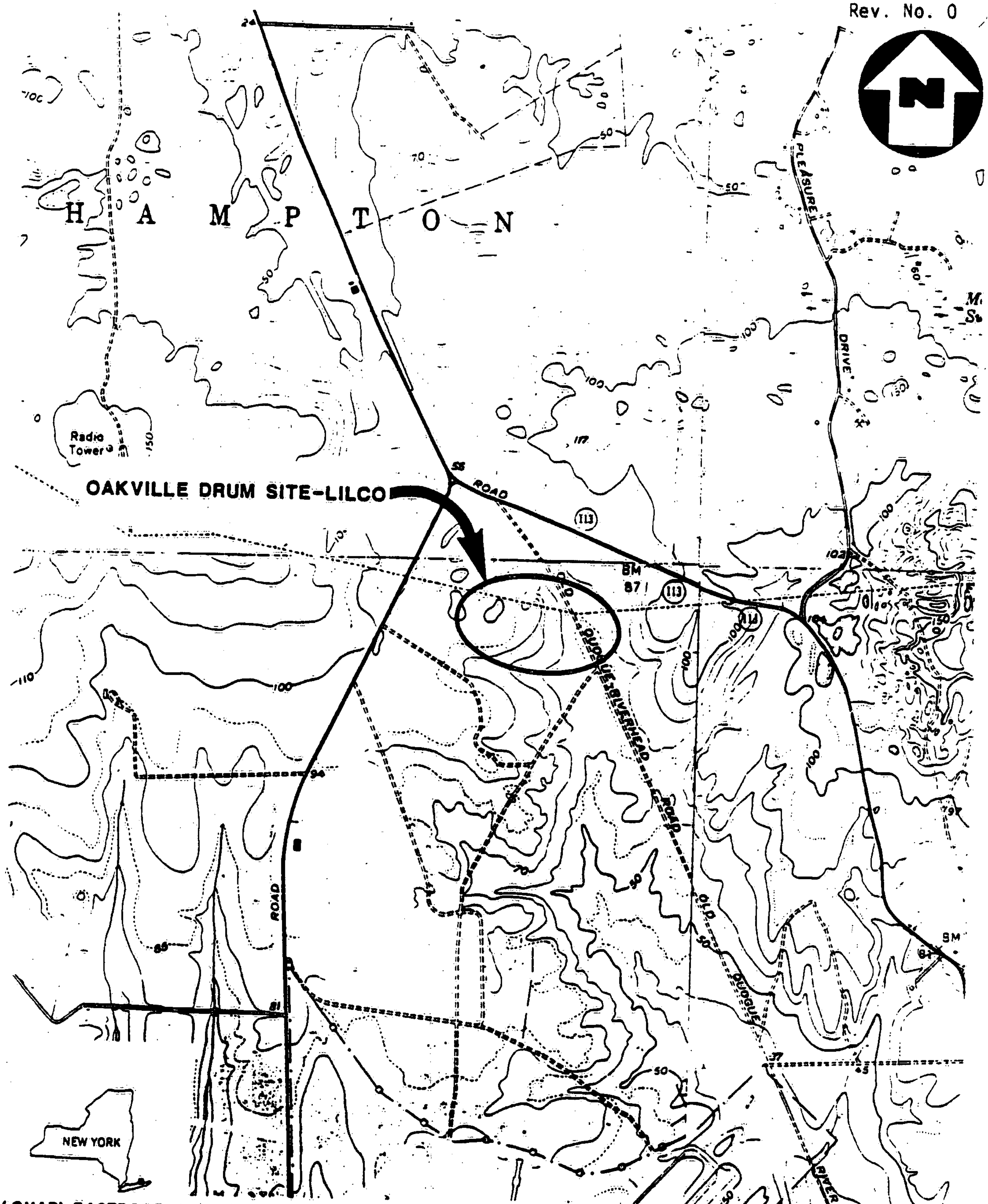
5. Sample Dispatch Data:

A total of seven soil samples for medium concentration organic analysis were shipped by FIT 2 personnel via Federal Express under Airbill No. 7878008434 to Century Laboratories, Incorporated on May 9, 1989 at 1640 hours.

A total of three aqueous samples for organic analysis were shipped by FIT 2 personnel via Federal Express under Airbill No. 2738329646 to Century Laboratories, Incorporated on May 9, 1989 at 1640 hours.

6. Sampling Personnel:

Name	Organization	Duties on Site
Joe Murtaugh	NUS Corporation, FIT 2	Site Manager, Written and Photographic Documentation
Don Hessemer	NUS Corporation, FIT 2	Site Safety Officer
Tom Varner	NUS Corporation, FIT 2	Sample Management Officer
Rich Pagano	NUS Corporation, FIT 2	Sampler
Gerald Hannay	NUS Corporation, FIT 2	Sampler
~~~~



(QUAD) EASTPORT, N.Y.

FIGURE 1

SITE LOCATION MAP

OAKVILLE DRUM SITE-LILCO, SOUTHAMPTON, N.Y.

SCALE: 1 = 2000

NUS CORPORATION

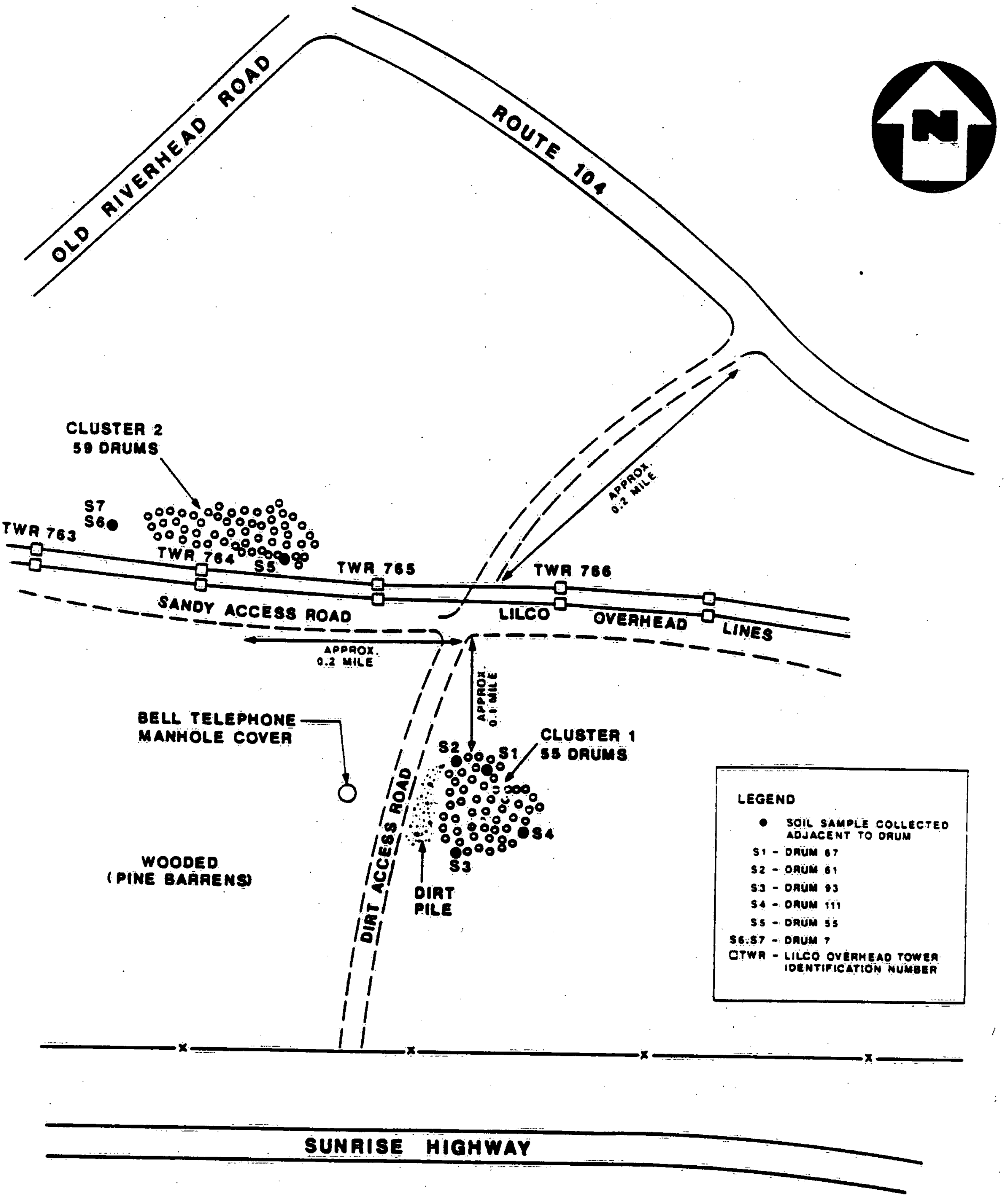


FIGURE 2

SAMPLE LOCATION MAP

OAKVILLE DRUM SITE-LILCO, SOUTHAMPTON, N.Y.

NOT TO SCALE

NUS CORPORATION

TABLE I

SAMPLE DESCRIPTIONS
OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK
JANUARY 25, 1989
CASE NO. 11290

NUS Sample ID Number	CLP Organic Traffic Report No.	CLP Inorganic Traffic Report No.	Collection Time (Hours)	Sample Type	Sample Location
NYEI-S1*	BZ751	MBX451	1138	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 67. Located in the first drum cluster, 64 feet, 70° from the Bell Telephone manhole cover.
NYEI-S2	BZ752	MBX452	1204	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 61. Located in the first drum cluster, 60 feet, 60°, from the Bell Telephone manhole cover.
NYEI-S3	BZ753	MBX453	1230	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 93. Located in the first drum cluster, 43 feet, 130°, from the Bell Telephone manhole cover.
NYEI-S4	BZ754	MBX454	1415	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 111. Located in the first drum cluster, 58 feet, 110°, from the Bell Telephone manhole cover.

* MS/MSD - Indicates that additional sample volume was collected and shipped to the laboratory for matrix spike (MS) and matrix spike duplicate (MSD) analysis.

TABLE I
CONTINUED
SAMPLE DESCRIPTIONS
OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK
JANUARY 25, 1989
CASE NO. 11290

NUS Sample ID Number	CLP Organic Traffic Report No.	CLP Inorganic Traffic Report No.	Collection Time (Hours)	Sample Type	Sample Location
NYEI-S5	BZ755	MBX455	1350	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 55. Located in the second drum cluster, 82 feet due east of tower 764, then 24 feet, 335° to the sample location area.
NYEI-S6	BZ756	MBX456	1314	Soil	Soil sample collected at a depth of 0-6 inches from the base of a drum. Located in the second drum cluster, 168 feet due west of Tower 764, then 29 feet 6 inches, 330° to the sample location area.
NYEI-S7**	BZ757	MBX457	1314	Soil	Same location as S-6.
NYEI-TRBL-1	BZ758	N/A	1100	Aqueous Trip Blank	Trip blank; demonstrated analyte-free water obtained from NUS Region 2 FIT, Edison, NJ.
NYE1-RIN-1*	BZ759	N/A	1110	Aqueous Rinsate Blank	Spatula rinsate blank collected in the field.
NYE1-RIN-2*	BZ760	MBX458	1135	Aqueous Rinsate Blank	Trowel/Bowl rinsate blank collected in the field.

* MS/MSD - Indicates that additional sample volume was collected and shipped to the laboratory for matrix spike (MS) and matrix spike duplicate (MSD) analysis.

** Duplicate - Indicates that a sample was designated for duplicate analysis.

N/A - Not Applicable.

TABLE I

SAMPLE DESCRIPTIONS
OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK
MAY 9, 1989
CASE NO. 11902

NUS Sample ID Number	CLP Organic Traffic Report No.	Collection Time (Hours)	Sample Type	Sample Location
NYEI-S1* 10-10-10	BAH08 1-6-1-	1135	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 67. Located in the first drum cluster, 64 feet, 70° from the Bell Telephone manhole cover.
NYEI-S2 16 16-16	BAH09 1-4-1 -	1202	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 61. Located in the first drum cluster, 60 feet, 60°, from the Bell Telephone manhole cover.
NYEI-S3 18-18-18	BAH10 1-1-1	1248	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 93. Located in the first drum cluster, 43 feet, 130°, from the Bell Telephone manhole cover.
NYEI-S4 -43-43 43	BAH12 1-20-1-	1240	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 111. Located in the first drum cluster, 58 feet, 110°, from the Bell Telephone manhole cover.

* MS/MSD - Indicates that additional sample volume was collected and shipped to the laboratory for matrix spike (MS) and matrix spike duplicate (MSD) analysis.

TABLE I
CONTINUED
SAMPLE DESCRIPTIONS
OAKVILLE DRUM SITE (LILCO)
SOUTHAMPTON, NEW YORK
MAY 9, 1989
CASE NO. 11902

NUS Sample ID Number Tm	CLP Organic Traffic Report No. DF	Collection Time (Hours)	Sample Type	Sample Location
NYEI-S5 17-17-17	BAH13 1-6-1-	1409	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No. 55. Located in the second drum cluster, 82 feet due east of tower 764, then 24 feet, 335° to the sample location area.
NYEI-S6 5-5-5	BAH14 1-6-1-	1348	Soil	Soil sample collected at a depth of 0-6 inches from the base of drum No.7. Located in the second drum cluster, 168 feet due west of tower 764, then 29 feet 6 inches, 330° to the sample location area.
NYEI-S7** 8-8-8-	BAH15 1-6-1-	1347	Soil	Same location as S-6
NYEI-TBLK-1 — 8 NA NA	BAH18 /8 / NA NA	1125	Aqueous Trip Blank	Trip blank; demonstrated analyte-free water obtained from NUS Region 2 FIT, Edison, NJ.
NYE1-RIN-1* — — —	BAH16 1-1-1	1130	Aqueous Rinsate Blank	Trowel rinsate blank collected in the field.
NYE1-RIN-2 — — —	BAH17 1-1-1	1155	Aqueous Rinsate Blank	Bowl rinsate blank collected in the field.

* MS/MSD - Indicates that additional sample volume was collected and shipped to the laboratory for matrix spike (MS) and matrix spike duplicate (MSD) analysis.

** Duplicate - Indicates that a sample was designated for duplicate analysis.

N/A - Not Applicable.

ATTACHMENT 1
SOP NO. HW-6

TOTAL REVIEW

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organics Analysis

Case No. 11902 SDG No BAHO 8 LABORATORY Century SITE Oakville Dro (LILCO)

DATA ASSESSMENT:

The current functional guidelines (1988) for evaluating organic data have been applied.

All data are valid and acceptable except those analytes which have been qualified with a "J" (estimated), "U" (non-detects), "R" (unusable), or "JN" (presumptive evidence for the presence of the material at an estimated value). All action is detailed on the attached sheets.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant QC problems the analysis is invalid and provides <u>no information</u> as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Reviewer's Signature: [signature] Date: 6/26/1989

Verified By: Pamela D Greenlaw Date: 6/27/1989

DATA ASSESSMENT:

2. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip field, rinse and water blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field blanks measure cross- contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for the common contaminants), the analytes are qualified as non- detects, "U". The following analytes in the samples shown were qualified with "U" for these reasons:

A) Method blank contamination

-alpha chlordane was flagged non-detect in sample BAH09 and BAH10
-heptachlor was flagged non-detect in sample BAH10 & 13
-DDT was flagged nondetect in samples BAH10, 13, 14 & 15

B) Field or rinse blank contamination ("water blanks" or "distilled water blanks" are validated like any other sample)

Di-n-butylphthalate & bis(2-ethyl hexyl)phthalate were flagged non-detect in sample BAH08

C) Trip blank contamination

DATA ASSESSMENT:

4. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) RESPONSE FACTOR:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound List (TCL) must be $\geq$ 0.05 in both the initial and continuing calibrations. A value < 0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected ("R").

2-Butanone was flagged ~~[illegible]~~ rejected in saples BAH, 16, 17, 18, 08, 09, 10, 12, 13, 14, 15 due to initial calib.

DATA ASSESSMENT:

5. CALIBRATION:

A) PERCENT RELATIVE STANDARD DEVIATION (%RSD) AND PERCENT DIFFERENCE (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be <30% and %D must be <25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ" (if %D or RSD >50%). If there is a gross deviation of %RSD and %D, the non-detects may be rejected ("R").

For the PCB/PESTICIDE fraction, %RSD for aldrin, endrin, DDT, and dibutylchlorendate must not exceed 10%. Percent D must be within 15% on the quantitation column and 20% on the confirmation column.

– Bromomethane was flagged estimated (J) in sample BAH 16, 17 & 18 due to % RSD > 50.

– Benzoic acid and 4-nitrophenol were flagged estimated (J) due to %D > 50 in samples BAH09, 10, 12, 14 & 15.

– 2,6 dinitrotoluene was flagged estimated (J) in samples BAH08 BAH13, BAH 16 due to %D > 50.

DATA ASSESSMENT:

6. SURROGATES:

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

— all VOA analytes in samples BAH17, BAH09, BAK10, BAH08, BAH12, BAH14, BAH15, were flagged estimated (J) due to hi recoveries.

— all analytes in pesticide sample BAH15 were flagged estimated (J) due to low recoveries.

DATA ASSESSMENT:

7. INTERNAL STANDARDS PERFORMANCE:

Internal standard (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than ±30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

VOA - Internal standards for samples BAH08, 09, 10, 13, 14 & 15 were out of criteria. (See surrogate % recovery summary also.)

DATA ASSESSMENT:

9. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for some additional qualification of the data.

4-nitrophenol was rejected (R) in sample BAH08 because there was Ø recovery in MS/MSD.

DATA ASSESSMENT:

10. OTHER QC DATA OUT OF SPECIFICATION:

11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT (continued on next page if necessary):

- Missing GC/MS DFTPP forms for BNA BA+08 + 13 and cont. calibration

12. CONTRACT PROBLEMS____NON-COMPLIANCE:

13. This package contains re-extraction, re-analysis or dilution. Upon reviewing the QA results, the following form I(s) are identified to be used.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Dec. 1988
Number: HW-2
Revision: 8

Case# 11290 Site OAKVILLE DRUM Matrix: Soil 7

Reviewer JOHN BULICH JB Lab LAUCKS Water 1

Contractor NUS (F112) Other —

A.2.1 All data are of acceptable quality? Yes ____ No ✓

If no, exceptions are noted below with reason(s) for rejection or qualification as estimated value (J).

A) The following analytes are qualified as rejected (red-lined) because they do not meet the criteria:

1) Field Duplicates (>2XCRDL) As → MBX451-457

2) Field Blanks (>2X IDL) Zn → MBX 451, 453, 454, 457

B) The following analytes are qualified as estimated (flagged with "J") because they do not meet criteria:

1) CRDL Std (<90%) Cu → MBX451, 452 Pb → MBX458

Tl → MBX 451-458 V → MBX455

CRDL Std (>110%) As → MBX451-453, 455, 457 Cr → MBX451, 452

2) Spiked Sample Rec (10-74%) Sb, Mn, Se, Ag → MBX451-457

3) Lab Duplicate (>50% RPD) Cu → MBX 453-457

A.2.1 (continuation)

A.2.2 Contract Problems/Non-compliance

1) Form I, MBX453 has an incorrect Lab Sample ID #.

MMB Reviewer: ______________________ Date: ________
Signature

Contractor Reviewer: John Balicky Date: 3/29/89
Signature

Verified by: ______________________ Date: ________

CASE NARRATIVE

(INORGANIC)

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

Case No: 11290
SDG No: MBX451
Contract No: 68-W8-0014
Lab No.: 14276
Date of this report: March 01, 1989

GENERAL REMARKS FOR THIS CASE:

The following samples were analyzed under the above case and SDG numbers:

SMO Sample Number	LTL Sample Number	Analysis Request
MBX451	14276-1	Total Metals
MBX452	14276-2	Total Metals
MBX453	14276-3	Total Metals
MBX454	14276-4	Total Metals
MBX455	14276-5	Total Metals
MBX456	14276-6	Total Metals
MBX457	14276-7	Total Metals
MBX458	14276-8	Total Metals

Initial Calibration Verification (ICV) and Laboratory Control Sample (LCS) Identification:

ICP:

ICV = ICV-1 (0288)
ICS = Part A (1287) + Part B (0387)

GF:

ICV = ICV-2 (0887) As + Se
ICV-3 (0787) Sb prepared 1/100 for GF so true value = 101.0 ug/l
ICV-4 (0387) Pb + Tl

HG:

ICV = ICV-5 (0487)

GENERAL:

LCSS = LCSS (0287)

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

LCSW = For ICP = ICV-1 (0288)
For GF = ICV-2 (0887)
= ICV-3 (0787)
= ICV-4 (0387)

ICP Metals:

The preparation blank for metals in soil is calculated to mg/kg by assuming a sample weight of 1.00g/200ml. Total solids of 100% is also assumed.

On the first timed and dated page of each ICP run, the data to be reported or rejected will be tabulated for that run.

Graphite Furnace Metals:

Standards: Working solutions are diluted on the day of analysis from the conentrated standards (1000 mg/l) obtained from VWR.

As, Tl working solution concentrations are 10.0, 25.0, and 50.0 ug/l.

Se working solution concentrations are 5.0, 10.0, 25.0, and 50.0 ug/l.

Pb working solution concentrations are 5.0, 10.0, 25.0, 50.0, and 100.0 ug/l.

Sb working solution concentrations are 60.0, 150.0, and 300.0 ug/l.

Continuing Calibration Verification: The mid-range standard from the calibration made on the day of the analysis is used as the continuing calibration verification.

For As, Se, Tl the CCV concentration is 25.0 ug/l.

For Pb the CCV concentration is 50.0 ug/l.

For Sb the CCV concentration is 150.0 ug/l.

Blanks: Initial calibration and continuing calibration blanks are double-deionized water with the appropriate acid concentrations.

Soil preparations blanks are reported on the basis of 1.000 g. sample weight and 100% total solids.

Screening of samples prior to analysis: Pb is initially performed by ICP and samples are then analyzed by Graphite Furnace as required.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

Dilutions of samples: Samples may be diluted for Graphite Furnace analysis based on results from ICP. Dilutions made to the basis of initial results from undiluted sample analysis or from a previous ICP analysis are noted on the Lauck's Data sheet and on the raw data printout of sample results.

Timing of CCV, CCB analysis: The Perkin-Elmer Z3030 does not print the time for each analysis. Therefore, when the analyst is not present, the times of analysis are estimated and manually recorded based on the starting time and analytical program being used.

Percent recovery of analytical spikes: Percent Recovery is calculated and entered on the Lauck's Data sheet which lists the samples analyzed for each run.

Data which are not used for sample quantitation is noted on the Lauck's Data sheet and the Z3030 printout. All reject data are crossed out on the raw data printouts.

Although Sb is always analyzed by graphite furnace, the ICP digest is analyzed because of the contractural requirement on page D-6. Therefore when calculating soil results the ICP digest weight must be used.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

Mercury:

The date and time are manually entered on the strip-chart recordings.

Laucks purchases a 1000 mg/L Hg stock solution form VWR. The 1.0 mg/L working standard is made by taking 100 ul and diluting to 100ml with 2% HNO_3. The standard curve is made by placing 0, 50, 100, 500, and 1000 ul in a BOD bottle and diluting up to 100 ml. The standard curve is equal to 0, 0.5, 1.0, 5.0 and 10.0 ug/L.

The preparation blank for mercury in soil is calculated to mg/kg by assuming a sample weight of 0.20g/100ml. Total solids of 100% is also assumed.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

REMARKS FOR THIS CASE:

All sample and shipment containers were received sealed and in good condition.

ICP Metals:

No problems were encountered.

Graphite Furnace Metals

No problems were encountered.

Mercury:

No problems were encountered.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

RELEASE OF DATA

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signatures.

Respectfully submitted,

Catherine Greer
Catherine Greer
EPA Coordinator
3-1-89
(date)

Mary Beth Lanza
Mary Beth Lanza
Project Manager
03/01/89
(date)

unmarked

TDD No. 02-8802-15

NUS
Region 2 FIT

PROCEDURE FOR ADMINISTRATIVE VERIFICATION OF INORGANIC DATA VALIDATION

Case No. 11290 | Lab LAUCKS | Site OAKVILLE DRUM

Date Received From EPA 3/14/89 | Date Returned to EPA

- ☐ 1) Read the Data Acceptability Narrative (prepared by the reviewer) and make sure that everything addressed in it is also addressed in the checklist.
- ☐ 2) Read the contract compliance screening (CCS) and the lab's response (if available).
- ☐ 3) Make sure that everything addressed in the CCS is also addressed in the Data Acceptablilty Narrative unless it was resubmitted correctly by the lab (in the lab's response and the updated CCS).
- ☐ 4) Make sure that everything addressed in the narrative that was not corrected by resubmittals required by CCS is addressed in the data assessment.
- ☐ 5) Make sure Data Summary Sheets (prepared by the reviewer) have all out of control limit values circled in red.
- ☐ 6) Look through the sample data summaries (Form I) to make sure they are qualified as per the Data Acceptablility Narrative and that all qualifiers are addressed in the Data Acceptability Narrative.
- ☐ 7) Look through the appropriate QA/QC summaries (dates, instruments, etc.) to make sure that they are applicable to qualified data.
- ☐ 8) Make sure that CLP Data Acceptability Summary was properly filled out by the reviewer and that all figures are correct.
- ☐ 9) Return to the reviewer for corrections.
- ☐ 10) If acceptable, sign the Data Acceptability Narrative.

Date (Returned for Corrections) (Signed)

Reviewer

Comments

Released for Internal Use

(Date)

Data Tracking Complete

4/4/89
(Date)

Rev. 2, 1/89

RECORD OF COMMUNICATION

☐ PHONE CALL ☐ DISCUSSION ☐ FIELD TRIP ☐ CONFERENCE ☐ OTHER (SPECIFY)

(Record of item checked above)

TO: Frank Messina

FROM: Smita M.Sumbaly

DATE 06/22/89

TIME 09:30a.m.

SUBJECT
CLP Organic Data Packages For Quality Assurance Review

SUMMARY OF COMMUNICATION
The Following CLP Organic Data are being sent to MMB for review

SITE	CASE #/ SAS #	LABORATORY	ANALYSIS/ MATRIX	NUMBER OF SAMPLES	BLANK NUMBER(S)	DUPLICATE NUMBER(S)
Tronic Plating R3/RI/FS	11904	E & E	Organics Soil	01	None	None
Tronic Plating R3/RI/FS	11859	Intech	Water Soil	01 04	BAJ-56(FB)	None
Goose Farm R2/Oversight	11848	NY Test	Soil	04	None	None
Oakville Drum Site.FIT/SI	11902	Centry	Water Soil	03 07	BAH-16(RB) BAH-17(RB) BAH-18(TB)	BAH-14-15
Brewer Titche-ner FIT/SI	11858	Cambridge	Water Soil	04 07	BZ-988(RB) BZ-989(RB) BZ-990(RB) BZ-991(TB)	BZ-984-985
SCP R3/RI/FS	11829	Recra	Water	02	BAF-87(TB)	None

* Lab did't analyzed the sample BZ=988 because it was broken o arrival.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO: File and Data Package

EPA Form 1300-6 (7-72) REPLACES EPA HQ FORM 5300-3 WHICH MAY BE USED UNTIL SUPPLY IS EXHAUSTED.

Oakville Drum Site
FIT/SI.
7(S)
3(W)

REPORT NARRATIVE

The following report contains the results for ~~samples~~ submitted to NET Mid-Atlantic, Inc. by USEPA Region II, Case #11902, SDG #BAH08. The samples were received by the laboratory on April 27-~~28, 1989~~ and analyzed for Volatile Organics, Base Neutral/Acid Extractables and Pesticide/PCB's. The following samples are associated with this report:

VOLATILE ORGANICS

1. The following samples were originally analyzed and had surrogates outside the control limits: BAH09, BAH10, BAH08, BAH14, and BAH15. All samples were reanalyzed except for BAH09. The reanalyses of the samples also had surrogates outside the control limits.

2. Sample BAH12 had large matrix interferences in the area of the BFB primary ion. The secondary ion was used for quantitation.

ACID EXTRACTABLE BASE NEUTRALS

1. Sample BAH08 bwas analyzed twice due to internal standard areas being outside control limits.

Release of the data contained in this hard copy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Kenneth Bond
Kenneth Bond

6-16-89
Date

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH08

Lab Name: CENTRY   Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) G   Lab File ID: D0381

Level: (low/med) LOW   Date Received: 5/10/89

% Moisture: not dec. 10.   Date Analyzed: 5/18/89

Column: (pack/cap) PACK   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11.	U
74-83-9	Bromomethane	11.	U
75-01-4	Vinyl Chloride	11.	U
75-00-3	Chloroethane	11.	U
75-09-2	Methylene Chloride	100.	
67-64-1	Acetone	64.	
75-15-0	Carbon Disulfide	6.	U
75-35-4	1,1-Dichloroethene	6.	U
75-34-3	1,1-Dichloroethane	6.	U
540-59-0	1,2-Dichloroethene (total)	6.	U
67-66-3	Chloroform	6.	U
107-06-2	1,2-Dichloroethane	6.	U
78-93-3	2-Butanone	6.	U
71-55-6	1,1,1-Trichloroethane	11.	UR
56-23-5	Carbon Tetrachloride	6.	U
108-05-4	Vinyl Acetate	6.	U
75-27-4	Bromodichloromethane	11.	U
78-87-5	1,2-Dichloropropane	6.	U
10061-01-5	cis-1,3-Dichloropropene	6.	U
79-01-6	Trichloroethene	6.	U
124-48-1	Dibromochloromethane	6.	U
79-00-5	1,1,2-Trichloroethane	6.	U
71-43-2	Benzene	6.	U
10061-02-6	Trans-1,3-Dichloropropene	6.	U
75-25-2	Bromoform	6.	U
108-10-1	4-Methyl-2-Pentanone	6.	U
591-78-6	2-Hexanone	11.	U
127-18-4	Tetrachloroethene	11.	U
79-34-5	1,1,2,2-Tetrachloroethane	6.	U
108-88-3	Toluene	6.	U
108-90-7	Chlorobenzene	6.	U
100-41-4	Ethylbenzene	6.	U
100-42-5	Styrene	6.	U
1330-20-7	Xylene (total)	6.	U

000021

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH09

Lab Name: CENTRY

Contract: 68-W8-0078

Lab Code: CENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) SOIL

Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) G

Lab File ID: D0334

Level: (low/med) LOW

Date Received: 5/10/89

% Moisture: not dec. 16.

Date Analyzed: 5/12/89

Column: (pack/cap) PACK

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane		
74-83-9	Bromomethane	12.	U
75-01-4	Vinyl Chloride	12.	U
75-00-3	Chloroethane	12.	U
75-09-2	Methylene Chloride	12.	U
67-64-1	Acetone	54.	
75-15-0	Carbon Disulfide	12.	U
75-35-4	1,1-Dichloroethene	6.	U
75-34-3	1,1-Dichloroethane	6.	U
540-59-0	1,2-Dichloroethene (total)	6.	U
67-66-3	Chloroform	6.	U
107-06-2	1,2-Dichloroethane	6.	U
78-93-3	2-Butanone	6.	U
71-55-6	1,1,1-Trichloroethane	12.	U
56-23-5	Carbon Tetrachloride	6.	U
108-05-4	Vinyl Acetate	6.	U
75-27-4	Bromodichloromethane	12.	U
78-87-5	1,2-Dichloropropane	6.	U
10061-01-5	cis-1,3-Dichloropropene	6.	U
79-01-6	Trichloroethene	6.	U
124-48-1	Dibromochloromethane	6.	U
79-00-5	1,1,2-Trichloroethane	6.	U
71-43-2	Benzene	6.	U
10061-02-6	Trans-1,3-Dichloropropene	6.	U
75-25-2	Bromoform	6.	U
108-10-1	4-Methyl-2-Pentanone	6.	U
591-78-6	2-Hexanone	12.	U
127-18-4	Tetrachloroethene	12.	U
79-34-5	1,1,2,2-Tetrachloroethane	6.	U
108-88-3	Toluene	6.	U
108-90-7	Chlorobenzene	6.	U
100-41-4	Ethylbenzene	6.	U
100-42-5	Styrene	6.	U
1330-20-7	Xylene (total)	6.	U
		6.	U

000032

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH10

Lab Name: CENTRY

Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) G   Lab File ID: D0338

Level: (low/med) LOW   Date Received: 5/10/89

% Moisture: not dec. 18.   Date Analyzed: 5/12/89

Column: (pack/cap) PACK   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12.	U J
74-83-9	Bromomethane	12.	U
75-01-4	Vinyl Chloride	12.	U
75-00-3	Chloroethane	12.	U
75-09-2	Methylene Chloride	22.	
67-64-1	Acetone	12.	U
75-15-0	Carbon Disulfide	6.	U
75-35-4	1,1-Dichloroethene	6.	U
75-34-3	1,1-Dichloroethane	6.	U
540-59-0	1,2-Dichloroethene (total)	6.	U
67-66-3	Chloroform	6.	U
107-06-2	1,2-Dichloroethane	6.	U
78-93-3	2-Butanone	12.	U
71-55-6	1,1,1-Trichloroethane	6.	U
56-23-5	Carbon Tetrachloride	6.	U
108-05-4	Vinyl Acetate	12.	U
75-27-4	Bromodichloromethane	6.	U
78-87-5	1,2-Dichloropropane	6.	U
10061-01-5	cis-1,3-Dichloropropene	6.	U
79-01-6	Trichloroethene	6.	U
124-48-1	Dibromochloromethane	6.	U
79-00-5	1,1,2-Trichloroethane	6.	U
71-43-2	Benzene	6.	U
10061-02-6	Trans-1,3-Dichloropropene	6.	U
75-25-2	Bromoform	6.	U
108-10-1	4-Methyl-2-Pentanone	12.	U
591-78-6	2-Hexanone	12.	U
127-18-4	Tetrachloroethene	6.	U
79-34-5	1,1,2,2-Tetrachloroethane	6.	U
108-88-3	Toluene	6.	U
108-90-7	Chlorobenzene	6.	U
100-41-4	Ethylbenzene	6.	U
100-42-5	Styrene	6.	U
1330-20-7	Xylene (total)	6.	U J

000037

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH12

b Name: CENTRY Contract: 68-W8-0078

b Code: CENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

trix: (soil/water) SOIL Lab Sample ID:

ample wt/vol: 4.0 (g/mL) G Lab File ID: D0404

evel: (low/med) MED Date Received: 5/10/89

Moisture: not dec. 43. Date Analyzed: 5/19/89

olumn: (pack/cap) PACK Dilution Factor: ~~50.00~~

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	2200.	U J
74-83-9	Bromomethane	2200.	U
75-01-4	Vinyl Chloride	2200.	U
75-00-3	Chloroethane	2200.	U
75-09-2	Methylene Chloride	1100.	U
67-64-1	Acetone	2200.	U
75-15-0	Carbon Disulfide	1100.	U
75-35-4	1,1-Dichloroethene	1100.	U
75-34-3	1,1-Dichloroethane	1100.	U
540-59-0	1,2-Dichloroethene (total)	1100.	U
67-66-3	Chloroform	1100.	U
107-06-2	1,2-Dichloroethane	1100.	U
78-93-3	2-Butanone	2200.	U
71-55-6	1,1,1-Trichloroethane	1100.	U
56-23-5	Carbon Tetrachloride	1100.	U
108-05-4	Vinyl Acetate	2200.	U
75-27-4	Bromodichloromethane	1100.	U
78-87-5	1,2-Dichloropropane	1100.	U
10061-01-5	cis-1,3-Dichloropropene	1100.	U
79-01-6	Trichloroethene	1100.	U
124-48-1	Dibromochloromethane	1100.	U
79-00-5	1,1,2-Trichloroethane	1100.	U
71-43-2	Benzene	1100.	U
10061-02-6	Trans-1,3-Dichloropropene	1100.	U
75-25-2	Bromoform	1100.	U
108-10-1	4-Methyl-2-Pentanone	2200.	U
591-78-6	2-Hexanone	2200.	U
127-18-4	Tetrachloroethene	1100.	U
79-34-5	1,1,2,2-Tetrachloroethane	1100.	U
108-88-3	Toluene	1100.	U
108-90-7	Chlorobenzene	1100.	U
100-41-4	Ethylbenzene	1100.	U
100-42-5	Styrene	1100.	U
1330-20-7	Xylene (total)	6600.	

000044

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH13

Lab Name: CENTRY   Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) G   Lab File ID: D0364

Level: (low/med) LOW   Date Received: 5/10/89

% Moisture: not dec. 17.   Date Analyzed: 5/15/89

Column: (pack/cap) PACK   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12.	U
74-83-9	Bromomethane	12.	U
75-01-4	Vinyl Chloride	12.	U
75-00-3	Chloroethane	12.	U
75-09-2	Methylene Chloride	21.	
67-64-1	Acetone	28.	
75-15-0	Carbon Disulfide	6.	U
75-35-4	1,1-Dichloroethene	6.	U
75-34-3	1,1-Dichloroethane	6.	U
540-59-0	1,2-Dichloroethene (total)	6.	U
67-66-3	Chloroform	6.	U
107-06-2	1,2-Dichloroethane	6.	U
78-93-3	2-Butanone	12.	~~U~~ R
71-55-6	1,1,1-Trichloroethane	6.	U
56-23-5	Carbon Tetrachloride	1.	J
108-05-4	Vinyl Acetate	12.	U
75-27-4	Bromodichloromethane	6.	U
78-87-5	1,2-Dichloropropane	6.	U
10061-01-5	cis-1,3-Dichloropropene	6.	U
79-01-6	Trichloroethene	6.	U
124-48-1	Dibromochloromethane	6.	U
79-00-5	1,1,2-Trichloroethane	6.	U
71-43-2	Benzene	6.	U
10061-02-6	Trans-1,3-Dichloropropene	6.	U
75-25-2	Bromoform	6.	U
108-10-1	4-Methyl-2-Pentanone	12.	U
591-78-6	2-Hexanone	12.	U
127-18-4	Tetrachloroethene	6.	U
79-34-5	1,1,2,2-Tetrachloroethane	6.	U
108-88-3	Toluene	6.	U
108-90-7	Chlorobenzene	6.	U
100-41-4	Ethylbenzene	6.	U
100-42-5	Styrene	6.	U
1330-20-7	Xylene (total)	6.	U

000059

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH14

Lab Name: CENTRY Contract: 68-W8-0078

Lab Code: CENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) G Lab File ID: D0380

Level: (low/med) LOW Date Received: 5/10/89

% Moisture: not dec. 5. Date Analyzed: 5/18/89

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11.	UJ
74-83-9	Bromomethane	11.	U
75-01-4	Vinyl Chloride	11.	U
75-00-3	Chloroethane	11.	U
75-09-2	Methylene Chloride	120.	
67-64-1	Acetone	11.	U
75-15-0	Carbon Disulfide	5.	U
75-35-4	1,1-Dichloroethene	5.	U
75-34-3	1,1-Dichloroethane	5.	U
540-59-0	1,2-Dichloroethene (total)	5.	U
67-66-3	Chloroform	5.	U
107-06-2	1,2-Dichloroethane	5.	U
78-93-3	2-Butanone	11.	~~U~~ R
71-55-6	1,1,1-Trichloroethane	5.	U
56-23-5	Carbon Tetrachloride	5.	U
108-05-4	Vinyl Acetate	11.	U
75-27-4	Bromodichloromethane	5.	U
78-87-5	1,2-Dichloropropane	5.	U
10061-01-5	cis-1,3-Dichloropropene	5.	U
79-01-6	Trichloroethene	5.	U
124-48-1	Dibromochloromethane	5.	U
79-00-5	1,1,2-Trichloroethane	5.	U
71-43-2	Benzene	5.	U
10061-02-6	Trans-1,3-Dichloropropene	5.	U
75-25-2	Bromoform	5.	U
108-10-1	4-Methyl-2-Pentanone	11.	U
591-78-6	2-Hexanone	11.	U
127-18-4	Tetrachloroethene	5.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U
108-88-3	Toluene	5.	U
108-90-7	Chlorobenzene	9.	
100-41-4	Ethylbenzene	5.	U
100-42-5	Styrene	5.	U
1330-20-7	Xylene (total)	5.	U

000066

FORM I VOA 1/87 Rev.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH15

Lab Name: CENTRY Contract: 68-W8-0078

Lab Code: CENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) G Lab File ID: D0379

Level: (low/med) LOW Date Received: 5/10/89

% Moisture: not dec. 8. Date Analyzed: 5/18/89

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11.	U J
74-83-9	Bromomethane	11.	U
75-01-4	Vinyl Chloride	11.	U
75-00-3	Chloroethane	11.	U
75-09-2	Methylene Chloride	120.	
67-64-1	Acetone	25.	J
75-15-0	Carbon Disulfide	5.	U
75-35-4	1,1-Dichloroethene	5.	U
75-34-3	1,1-Dichloroethane	5.	U
540-59-0	1,2-Dichloroethene (total)	5.	U
67-66-3	Chloroform	5.	U
107-06-2	1,2-Dichloroethane	5.	U
78-93-3	2-Butanone	11.	~~U~~ R
71-55-6	1,1,1-Trichloroethane	5.	U
56-23-5	Carbon Tetrachloride	5.	U
108-05-4	Vinyl Acetate	11.	U
75-27-4	Bromodichloromethane	5.	U
78-87-5	1,2-Dichloropropane	5.	U
10061-01-5	cis-1,3-Dichloropropene	5.	U
79-01-6	Trichloroethene	5.	U
124-48-1	Dibromochloromethane	5.	U
79-00-5	1,1,2-Trichloroethane	5.	U
71-43-2	Benzene	5.	U
10061-02-6	Trans-1,3-Dichloropropene	5.	U
75-25-2	Bromoform	5.	U
108-10-1	4-Methyl-2-Pentanone	5.	U
591-78-6	2-Hexanone	11.	U
127-18-4	Tetrachloroethene	11.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U
108-88-3	Toluene	5.	U
108-90-7	Chlorobenzene	5.	U
100-41-4	Ethylbenzene	5.	U
100-42-5	Styrene	5.	U
1330-20-7	Xylene (total)	5.	U

000078

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH16

Lab Name: CENTRY   Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) WATER   Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: C4224

Level: (low/med) LOW   Date Received: 5/10/89

% Moisture: not dec. 100.   Date Analyzed: 5/11/89

Column: (pack/cap) PACK   Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Concentration	Q
74-87-3	Chloromethane	10.	U
74-83-9	Bromomethane	10.	UJ
75-01-4	Vinyl Chloride	10.	U
75-00-3	Chloroethane	10.	U
75-09-2	Methylene Chloride	5.	U
67-64-1	Acetone	10.	U
75-15-0	Carbon Disulfide	5.	U
75-35-4	1,1-Dichloroethene	5.	U
75-34-3	1,1-Dichloroethane	5.	U
540-59-0	1,2-Dichloroethene (total)	5.	U
67-66-3	Chloroform	5.	U
107-06-2	1,2-Dichloroethane	5.	U
78-93-3	2-Butanone	10.	UK
71-55-6	1,1,1-Trichloroethane	5.	U
56-23-5	Carbon Tetrachloride	5.	U
108-05-4	Vinyl Acetate	10.	U
75-27-4	Bromodichloromethane	5.	U
78-87-5	1,2-Dichloropropane	5.	U
10061-01-5	cis-1,3-Dichloropropene	5.	U
79-01-6	Trichloroethene	5.	U
124-48-1	Dibromochloromethane	5.	U
79-00-5	1,1,2-Trichloroethane	5.	U
71-43-2	Benzene	5.	U
10061-02-6	Trans-1,3-Dichloropropene	5.	U
75-25-2	Bromoform	5.	U
108-10-1	4-Methyl-2-Pentanone	10.	U
591-78-6	2-Hexanone	10.	U
127-18-4	Tetrachloroethene	5.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U
108-88-3	Toluene	5.	U
108-90-7	Chlorobenzene	5.	U
100-41-4	Ethylbenzene	5.	U
100-42-5	Styrene	5.	U
1330-20-7	Xylene (total)	5.	U

000088

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH17

Lab Name: CENTRY

Contract: 68-W8-0078

Lab Code: CENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) WATER

Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) ML

Lab File ID: C4225

Level: (low/med) LOW

Date Received: 5/10/89

% Moisture: not dec. 100.

Date Analyzed: 5/11/89

Column: (pack/cap) PACK

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane		
74-83-9	Bromomethane	10.	U J
75-01-4	Vinyl Chloride	10.	U J
75-00-3	Chloroethane	10.	U
75-09-2	Methylene Chloride	10.	U
67-64-1	Acetone	5.	U
75-15-0	Carbon Disulfide	10.	U
75-35-4	1,1-Dichloroethene	5.	U
75-34-3	1,1-Dichloroethane	5.	U
540-59-0	1,2-Dichloroethene (total)	5.	U
67-66-3	Chloroform	5.	U
107-06-2	1,2-Dichloroethane	5.	U
78-93-3	2-Butanone	5.	U
71-55-6	1,1,1-Trichloroethane	10.	U R
56-23-5	Carbon Tetrachloride	5.	U J
108-05-4	Vinyl Acetate	5.	U
75-27-4	Bromodichloromethane	10.	U
78-87-5	1,2-Dichloropropane	5.	U
10061-01-5	cis-1,3-Dichloropropene	5.	U
79-01-6	Trichloroethene	5.	U
124-48-1	Dibromochloromethane	5.	U
79-00-5	1,1,2-Trichloroethane	5.	U
71-43-2	Benzene	5.	U
10061-02-6	Trans-1,3-Dichloropropene	5.	U
75-25-2	Bromoform	5.	U
108-10-1	4-Methyl-2-Pentanone	5.	U
591-78-6	2-Hexanone	10.	U
127-18-4	Tetrachloroethene	10.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U
108-88-3	Toluene	5.	U
108-90-7	Chlorobenzene	5.	U
100-41-4	Ethylbenzene	5.	U
100-42-5	Styrene	5.	U
1330-20-7	Xylene (total)	5.	U J

000092

FORM I VOA

1/87 Rev.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH18

Lab Name: CENTRY

Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) WATER

Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) ML

Lab File ID: C4227

Level: (low/med) LOW

Date Received: 5/10/89

% Moisture: not dec. 100.

Date Analyzed: 5/11/89

Column: (pack/cap) PACK

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10.	U
74-83-9	Bromomethane	10.	U
75-01-4	Vinyl Chloride	10.	U
75-00-3	Chloroethane	10.	U
75-09-2	Methylene Chloride	5.	U
67-64-1	Acetone	10.	U
75-15-0	Carbon Disulfide	5.	U
75-35-4	1,1-Dichloroethene	5.	U
75-34-3	1,1-Dichloroethane	5.	U
540-59-0	1,2-Dichloroethene (total)	5.	U
67-66-3	Chloroform	5.	U
107-06-2	1,2-Dichloroethane	5.	U
78-93-3	2-Butanone	10.	U R
71-55-6	1,1,1-Trichloroethane	5.	U
56-23-5	Carbon Tetrachloride	5.	U
108-05-4	Vinyl Acetate	10.	U
75-27-4	Bromodichloromethane	5.	U
78-87-5	1,2-Dichloropropane	5.	U
10061-01-5	cis-1,3-Dichloropropene	5.	U
79-01-6	Trichloroethene	5.	U
124-48-1	Dibromochloromethane	5.	U
79-00-5	1,1,2-Trichloroethane	5.	U
71-43-2	Benzene	5.	U
10061-02-6	Trans-1,3-Dichloropropene	5.	U
75-25-2	Bromoform	5.	U
108-10-1	4-Methyl-2-Pentanone	10.	U
591-78-6	2-Hexanone	10.	U
127-18-4	Tetrachloroethene	5.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U
108-88-3	Toluene	5.	U
108-90-7	Chlorobenzene	5.	U
100-41-4	Ethylbenzene	5.	U
100-42-5	Styrene	5.	U
1330-20-7	Xylene (total)	5.	U

000096

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH08

Lab Name: CENTRY

Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 30.0 (g/mL) G   Lab File ID: A1034

Level: (low/med) LOW   Date Received: 5/10/89

% Moisture: not dec. 10. dec. 0.   Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 5/24/89

GPC Cleanup: (Y/N) N   pH: .0   Dilution Factor: 6.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	2200.	U
111-44-4	bis(2-Chloroethyl)ether	2200.	U
95-57-8	2-Chlorophenol	2200.	U
541-73-1	1,3-Dichlorobenzene	2200.	U
106-46-7	1,4-Dichlorobenzene	2200.	U
100-51-6	Benzyl alcohol	2200.	U
95-50-1	1,2-Dichlorobenzene	2200.	U
95-48-7	2-Methylphenol	2200.	U
39638-32-9	bis(2-Chloroisopropyl)ether	2200.	U
106-44-5	4-Methylphenol	2200.	U
621-64-7	N-Nitroso-di-n-propylamine	2200.	U
67-72-1	Hexachloroethane	2200.	U
98-95-3	Nitrobenzene	2200.	U
78-59-1	Isophorone	2200.	U
88-75-5	2-Nitrophenol	2200.	U
105-67-9	2,4-Dimethylphenol	2200.	U
65-85-0	Benzoic acid	300.	J
111-91-1	bis(2-Chloroethoxy)methane	2200.	U
120-83-2	2,4-Dichlorophenol	2200.	U
120-82-1	1,2,4-Trichlorobenzene	2200.	U
91-20-3	Naphthalene	2200.	U
106-47-8	4-Chloroaniline	2200.	U
87-68-3	Hexachlorobutadiene	2200.	U
59-50-7	4-Chloro-3-methylphenol	2200.	U
91-57-6	2-Methylnaphthalene	2200.	U
77-47-4	Hexachlorocyclopentadiene	2200.	U
88-06-2	2,4,6-Trichlorophenol	2200.	U
95-95-4	2,4,5-Trichlorophenol	11000.	U
91-58-7	2-Chloronaphthalene	2200.	U
88-74-4	2-Nitroaniline	11000.	U
131-11-3	Dimethylphthalate	2200.	U
208-96-8	Acenaphthylene	2200.	U
606-20-2	2,6-Dinitrotoluene	2200.	U

000227

1C

EPA SAMPLE NO.

[LE ORGANICS ANALYSIS DATA SHEET]

BAH08

Contract: 68-W8-0078

[ATRY] Case No.: 11902 SAS No.: SDG No.: BAH08

[soil/water) SOIL Lab Sample ID:

wt/vol: 30.0 (g/mL) G Lab File ID: A1034

[l]: (low/med) LOW Date Received: 5/10/89

Moisture: not dec. 10. dec. 0. Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/24/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 6.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	11000.	U
83-32-9	Acenaphthene	2200.	U
51-28-5	2,4-Dinitrophenol	11000.	U
100-02-7	4-Nitrophenol	11000.	U R
132-64-9	Dibenzofuran	2200.	U
121-14-2	2,4-Dinitrotoluene	2200.	U
84-66-2	Diethylphthalate	2200.	U
7005-72-3	4-Chlorophenyl-phenylether	2200.	U
86-73-7	Fluorene	2200.	U
100-01-6	4-Nitroaniline	11000.	U
534-52-1	4,6-Dinitro-2-methylphenol	11000.	U
86-30-6	N-Nitrosodiphenylamine (1)	2200.	U
101-55-3	4-Bromophenyl-phenylether	2200.	U
118-74-1	Hexachlorobenzene	2200.	U
87-86-5	Pentachlorophenol	11000.	U
85-01-8	Phenanthrene	2200.	U
120-12-7	Anthracene	2200.	U
84-74-2	Di-n-butylphthalate	87.	
206-44-0	Fluoranthene	2200.	U
129-00-0	Pyrene	2200.	U
85-68-7	Butylbenzylphthalate	2200.	U
91-94-1	3,3'-Dichlorobenzidine	4500.	U
56-55-3	Benzo(a)anthracene	2200.	U
218-01-9	Chrysene	2200.	U
117-81-7	bis(2-Ethylhexyl)phthalate	120.	
117-84-0	Di-n-octylphthalate	2200.	U
205-99-2	Benzo(b)fluoranthene	2200.	U
207-08-9	Benzo(k)fluoranthene	2200.	U
50-32-8	Benzo(a)pyrene	2200.	U
193-39-5	Indeno(1,2,3-cd)pyrene	2200.	U
53-70-3	Dibenz(a,h)anthracene	2200.	U
191-24-2	Benzo(g,h,i)perylene	2200.	U

(1) - Cannot be separated from diphenylamine

000228

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH09

Lab Name: CENTRY   Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 1.0 (g/mL) G   Lab File ID: A0981

Level: (low/med) MED   Date Received: 5/10/89

% Moisture: not dec. 16. dec. 0.   Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 5/18/89

GPC Cleanup: (Y/N) N   pH: .0   Dilution Factor: 4.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	95000.	U
111-44-4	bis(2-Chloroethyl)ether	95000.	U
95-57-8	2-Chlorophenol	95000.	U
541-73-1	1,3-Dichlorobenzene	95000.	U
106-46-7	1,4-Dichlorobenzene	95000.	U
100-51-6	Benzyl alcohol	95000.	U
95-50-1	1,2-Dichlorobenzene	95000.	U
95-48-7	2-Methylphenol	95000.	U
39638-32-9	bis(2-Chloroisopropyl)ether	95000.	U
106-44-5	4-Methylphenol	95000.	U
621-64-7	N-Nitroso-di-n-propylamine	95000.	U
67-72-1	Hexachloroethane	95000.	U
98-95-3	Nitrobenzene	95000.	U
78-59-1	Isophorone	95000.	U
88-75-5	2-Nitrophenol	95000.	U
105-67-9	2,4-Dimethylphenol	95000.	U
65-85-0	Benzoic acid	470000.	U
111-91-1	bis(2-Chloroethoxy)methane	95000.	U
120-83-2	2,4-Dichlorophenol	95000.	U
120-82-1	1,2,4-Trichlorobenzene	95000.	U
91-20-3	Naphthalene	95000.	U
106-47-8	4-Chloroaniline	95000.	U
87-68-3	Hexachlorobutadiene	95000.	U
59-50-7	4-Chloro-3-methylphenol	95000.	U
91-57-6	2-Methylnaphthalene	95000.	U
77-47-4	Hexachlorocyclopentadiene	95000.	U
88-06-2	2,4,6-Trichlorophenol	95000.	U
95-95-4	2,4,5-Trichlorophenol	470000.	U
91-58-7	2-Chloronaphthalene	95000.	U
88-74-4	2-Nitroaniline	470000.	U
131-11-3	Dimethylphthalate	95000.	U
208-96-8	Acenaphthylene	95000.	U
606-20-2	2,6-Dinitrotoluene	95000.	U

000260

1C
.VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH09

CENTRY Contract: 68-W8-0078

.: CENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

x: (soil/water) SOIL Lab Sample ID:

ple wt/vol: 1.0 (g/mL) G Lab File ID: A0981

Level: (low/med) MED Date Received: 5/10/89

% Moisture: not dec. 16. dec. 0. Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/18/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 4.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	470000.	U
83-32-9	Acenaphthene	95000.	U
51-28-5	2,4-Dinitrophenol	470000.	U
100-02-7	4-Nitrophenol	470000.	U
132-64-9	Dibenzofuran	95000.	U
121-14-2	2,4-Dinitrotoluene	95000.	U
84-66-2	Diethylphthalate	95000.	U
7005-72-3	4-Chlorophenyl-phenylether	95000.	U
86-73-7	Fluorene	95000.	U
100-01-6	4-Nitroaniline	470000.	U
534-52-1	4,6-Dinitro-2-methylphenol	470000.	U
86-30-6	N-Nitrosodiphenylamine (1)	95000.	U
101-55-3	4-Bromophenyl-phenylether	95000.	U
118-74-1	Hexachlorobenzene	95000.	U
87-86-5	Pentachlorophenol	470000.	U
85-01-8	Phenanthrene	95000.	U
120-12-7	Anthracene	95000.	U
84-74-2	Di-n-butylphthalate	95000.	U
206-44-0	Fluoranthene	95000.	U
129-00-0	Pyrene	95000.	U
85-68-7	Butylbenzylphthalate	95000.	U
91-94-1	3,3'-Dichlorobenzidine	190000.	U
56-55-3	Benzo(a)anthracene	95000.	U
218-01-9	Chrysene	95000.	U
117-81-7	bis(2-Ethylhexyl)phthalate	95000.	U
117-84-0	Di-n-octylphthalate	95000.	U
205-99-2	Benzo(b)fluoranthene	95000.	U
207-08-9	Benzo(k)fluoranthene	95000.	U
50-32-8	Benzo(a)pyrene	95000.	U
193-39-5	Indeno(1,2,3-cd)pyrene	95000.	U
53-70-3	Dibenz(a,h)anthracene	95000.	U
191-24-2	Benzo(g,h,i)perylene	95000.	U

(1) - Cannot be separated from diphenylamine

000262

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH10

Lab Name: CENTRY   Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 1.0 (g/mL) G   Lab File ID: A0979

Level: (low/med) MED   Date Received: 5/10/89

% Moisture: not dec. 18. dec. 0.   Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 5/18/89

GPC Cleanup: (Y/N) N   pH: .0   Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
108-95-2	Phenol	24000.	U
111-44-4	bis(2-Chloroethyl)ether	24000.	U
95-57-8	2-Chlorophenol	24000.	U
541-73-1	1,3-Dichlorobenzene	24000.	U
106-46-7	1,4-Dichlorobenzene	24000.	U
100-51-6	Benzyl alcohol	24000.	U
95-50-1	1,2-Dichlorobenzene	24000.	U
95-48-7	2-Methylphenol	24000.	U
39638-32-9	bis(2-Chloroisopropyl)ether	24000.	U
106-44-5	4-Methylphenol	24000.	U
621-64-7	N-Nitroso-di-n-propylamine	24000.	U
67-72-1	Hexachloroethane	24000.	U
98-95-3	Nitrobenzene	24000.	U
78-59-1	Isophorone	24000.	U
88-75-5	2-Nitrophenol	24000.	U
105-67-9	2,4-Dimethylphenol	24000.	U
65-85-0	Benzoic acid	120000.	U
111-91-1	bis(2-Chloroethoxy)methane	24000.	U
120-83-2	2,4-Dichlorophenol	24000.	U
120-82-1	1,2,4-Trichlorobenzene	24000.	U
91-20-3	Naphthalene	18000.	J
106-47-8	4-Chloroaniline	24000.	U
87-68-3	Hexachlorobutadiene	24000.	U
59-50-7	4-Chloro-3-methylphenol	24000.	U
91-57-6	2-Methylnaphthalene	24000.	U
77-47-4	Hexachlorocyclopentadiene	24000.	U
88-06-2	2,4,6-Trichlorophenol	24000.	U
95-95-4	2,4,5-Trichlorophenol	120000.	U
91-58-7	2-Chloronaphthalene	24000.	U
88-74-4	2-Nitroaniline	120000.	U
131-11-3	Dimethylphthalate	24000.	U
208-96-8	Acenaphthylene	24000.	U
606-20-2	2,6-Dinitrotoluene	24000.	U

000287

FORM I SV-1   1/87 Rev.

1C

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH10

NTRY — Contract: 68-W8-0078

ENTRY — Case No.: 11902 — SAS No.: — SDG No.: BAH08

oil/water) SOIL — Lab Sample ID:

t/vol: 1.0 (g/mL) G — Lab File ID: A0979

(low/med) MED — Date Received: 5/10/89

sture: not dec. 18. dec. 0. — Date Extracted: 5/16/89

ction: (SepF/Cont/Sonc) SONC — Date Analyzed: 5/18/89

Cleanup: (Y/N) N — pH: .0 — Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	120000.	U
83-32-9	Acenaphthene	24000.	U
51-28-5	2,4-Dinitrophenol	120000.	U
100-02-7	4-Nitrophenol	120000.	U
132-64-9	Dibenzofuran	24000.	U
121-14-2	2,4-Dinitrotoluene	24000.	U
84-66-2	Diethylphthalate	24000.	U
7005-72-3	4-Chlorophenyl-phenylether	24000.	U
86-73-7	Fluorene	24000.	U
100-01-6	4-Nitroaniline	120000.	U
534-52-1	4,6-Dinitro-2-methylphenol	120000.	U
86-30-6	N-Nitrosodiphenylamine (1)	24000.	U
101-55-3	4-Bromophenyl-phenylether	24000.	U
118-74-1	Hexachlorobenzene	24000.	U
87-86-5	Pentachlorophenol	120000.	U
85-01-8	Phenanthrene	24000.	U
120-12-7	Anthracene	24000.	U
84-74-2	Di-n-butylphthalate	24000.	U
206-44-0	Fluoranthene	24000.	U
129-00-0	Pyrene	24000.	U
85-68-7	Butylbenzylphthalate	24000.	U
91-94-1	3,3'-Dichlorobenzidine	49000.	U
56-55-3	Benzo(a)anthracene	24000.	U
218-01-9	Chrysene	24000.	U
117-81-7	bis(2-Ethylhexyl)phthalate	24000.	U
117-84-0	Di-n-octylphthalate	24000.	U
205-99-2	Benzo(b)fluoranthene	24000.	U
207-08-9	Benzo(k)fluoranthene	24000.	U
50-32-8	Benzo(a)pyrene	24000.	U
193-39-5	Indeno(1,2,3-cd)pyrene	24000.	U
53-70-3	Dibenz(a,h)anthracene	24000.	U
191-24-2	Benzo(g,h,i)perylene	24000.	U

000288

(1) - Cannot be separated from diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH12

Lab Name: SENTRY Contract: 68-W8-0078

Lab Code: SENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 1.0 (g/mL) G Lab File ID: A0982

Level: (low/med) MED Date Received: 5/10/89

% Moisture: not dec. 43. dec. 0. Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/18/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 20.00

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION	Q
108-95-2	Phenol	700000.	U
111-44-4	bis(2-Chloroethyl)ether	700000.	U
95-57-8	2-Chlorophenol	700000.	U
541-73-1	1,3-Dichlorobenzene	700000.	U
106-46-7	1,4-Dichlorobenzene	700000.	U
100-51-6	Benzyl alcohol	700000.	U
95-50-1	1,2-Dichlorobenzene	700000.	U
95-48-7	2-Methylphenol	700000.	U
39638-32-9	bis(2-Chloroisopropyl)ether	700000.	U
106-44-5	4-Methylphenol	700000.	U
621-64-7	N-Nitroso-di-n-propylamine	700000.	U
67-72-1	Hexachloroethane	700000.	U
98-95-3	Nitrobenzene	700000.	U
78-59-1	Isophorone	700000.	U
88-75-5	2-Nitrophenol	700000.	U
105-67-9	2,4-Dimethylphenol	700000.	U
65-85-0	Benzoic acid	3500000.	UJ
111-91-1	bis(2-Chloroethoxy)methane	700000.	U
120-83-2	2,4-Dichlorophenol	700000.	U
120-82-1	1,2,4-Trichlorobenzene	700000.	U
91-20-3	Naphthalene	700000.	U
106-47-8	4-Chloroaniline	350000.	J
87-68-3	Hexachlorobutadiene	700000.	U
59-50-7	4-Chloro-3-methylphenol	700000.	U
91-57-6	2-Methylnaphthalene	700000.	U
77-47-4	Hexachlorocyclopentadiene	73000.	J
88-06-2	2,4,6-Trichlorophenol	700000.	U
95-95-4	2,4,5-Trichlorophenol	700000.	U
91-58-7	2-Chloronaphthalene	3500000.	U
88-74-4	2-Nitroaniline	700000.	U
131-11-3	Dimethylphthalate	3500000.	U
208-96-8	Acenaphthylene	700000.	U
606-20-2	2,6-Dinitrotoluene	700000.	U

000316

1C

ATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH12

/

Contract: 68-W8-0078

RY Case No.: 11902 SAS No.: SDG No.: BAH08

/water) SOIL Lab Sample ID:

l: 1.0 (g/mL) G Lab File ID: A0982

ow/med) MED Date Received: 5/10/89

: not dec. 43. dec. 0. Date Extracted: 5/16/89

on: (SepF/Cont/Sonc) SONC Date Analyzed: 5/18/89

Cleanup: (Y/N) N pH: .0 Dilution Factor: 20.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
~~99-09-2~~	3-Nitroaniline		
83-32-9	Acenaphthene	3500000.	U
51-28-5	2,4-Dinitrophenol	700000.	U
100-02-7	4-Nitrophenol	3500000.	U
132-64-9	Dibenzofuran	3500000.	U
121-14-2	2,4-Dinitrotoluene	700000.	U
84-66-2	Diethylphthalate	700000.	U
7005-72-3	4-Chlorophenyl-phenylether	700000.	U
86-73-7	Fluorene	700000.	U
100-01-6	4-Nitroaniline	700000.	U
534-52-1	4,6-Dinitro-2-methylphenol	3500000.	U
86-30-6	N-Nitrosodiphenylamine (1)	3500000.	U
101-55-3	4-Bromophenyl-phenylether	700000.	U
118-74-1	Hexachlorobenzene	700000.	U
87-86-5	Pentachlorophenol	700000.	U
85-01-8	Phenanthrene	3500000.	U
120-12-7	Anthracene	700000.	U
84-74-2	Di-n-butylphthalate	700000.	U
206-44-0	Fluoranthene	700000.	U
129-00-0	Pyrene	700000.	U
85-68-7	Butylbenzylphthalate	700000.	U
91-94-1	3,3'-Dichlorobenzidine	700000.	U
56-55-3	Benzo(a)anthracene	1400000.	U
218-01-9	Chrysene	700000.	U
117-81-7	bis(2-Ethylhexyl)phthalate	700000.	U
117-84-0	Di-n-octylphthalate	700000.	U
205-99-2	Benzo(b)fluoranthene	700000.	U
207-08-9	Benzo(k)fluoranthene	700000.	U
50-32-8	Benzo(a)pyrene	700000.	U
193-39-5	Indeno(1,2,3-cd)pyrene	700000.	U
53-70-3	Dibenz(a,h)anthracene	700000.	U
191-24-2	Benzo(g,h,i)perylene	700000.	U
		700000.	U

(1) - Cannot be separated from diphenylamine

000317

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH13

Lab Name: CENTRY   Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 30.0 (g/mL) G   Lab File ID: A1032

Level: (low/med) LOW   Date Received: 5/10/89

% Moisture: not dec. 17. dec. 0.   Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 5/24/89

GPC Cleanup: (Y/N) N   pH: .0   Dilution Factor: 6.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	2400.	U
111-44-4	bis(2-Chloroethyl)ether	2400.	U
95-57-8	2-Chlorophenol	2400.	U
541-73-1	1,3-Dichlorobenzene	2400.	U
106-46-7	1,4-Dichlorobenzene	2400.	U
100-51-6	Benzyl alcohol	2400.	U
95-50-1	1,2-Dichlorobenzene	2400.	U
95-48-7	2-Methylphenol	2400.	U
39638-32-9	bis(2-Chloroisopropyl)ether	2400.	U
106-44-5	4-Methylphenol	2400.	U
621-64-7	N-Nitroso-di-n-propylamine	2400.	U
67-72-1	Hexachloroethane	2400.	U
98-95-3	Nitrobenzene	2400.	U
78-59-1	Isophorone	2400.	U
88-75-5	2-Nitrophenol	2400.	U
105-67-9	2,4-Dimethylphenol	2400.	U
65-85-0	Benzoic acid	1000.	J
111-91-1	bis(2-Chloroethoxy)methane	2400.	U
120-83-2	2,4-Dichlorophenol	2400.	U
120-82-1	1,2,4-Trichlorobenzene	2400.	U
91-20-3	Naphthalene	2400.	U
106-47-8	4-Chloroaniline	2400.	U
87-68-3	Hexachlorobutadiene	2400.	U
59-50-7	4-Chloro-3-methylphenol	2400.	U
91-57-6	2-Methylnaphthalene	2400.	U
77-47-4	Hexachlorocyclopentadiene	2400.	U
88-06-2	2,4,6-Trichlorophenol	2400.	U
95-95-4	2,4,5-Trichlorophenol	12000.	U
91-58-7	2-Chloronaphthalene	2400.	U
88-74-4	2-Nitroaniline	12000.	U
131-11-3	Dimethylphthalate	2400.	U
208-96-8	Acenaphthylene	2400.	U
606-20-2	2,6-Dinitrotoluene	2400.	UJ

000345

1C
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH13

ENTRY   Contract: 68-W8-0078

CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

(soil/water) SOIL   Lab Sample ID:

wt/vol: 30.0 (g/mL) G   Lab File ID: A1032

l: (low/med) LOW   Date Received: 5/10/89

Moisture: not dec. 17. dec. 0.   Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 5/24/89

GPC Cleanup: (Y/N) N   pH: .0   Dilution Factor: 6.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	12000.	U
83-32-9	Acenaphthene	2400.	U
51-28-5	2,4-Dinitrophenol	12000.	U
100-02-7	4-Nitrophenol	12000.	U
132-64-9	Dibenzofuran	2400.	U
121-14-2	2,4-Dinitrotoluene	2400.	U
84-66-2	Diethylphthalate	2400.	U
7005-72-3	4-Chlorophenyl-phenylether	2400.	U
86-73-7	Fluorene	2400.	U
100-01-6	4-Nitroaniline	12000.	U
534-52-1	4,6-Dinitro-2-methylphenol	12000.	U
86-30-6	N-Nitrosodiphenylamine (1)	2400.	U
101-55-3	4-Bromophenyl-phenylether	2400.	U
118-74-1	Hexachlorobenzene	2400.	U
87-86-5	Pentachlorophenol	12000.	U
85-01-8	Phenanthrene	2400.	U
120-12-7	Anthracene	2400.	U
84-74-2	Di-n-butylphthalate	2400.	U
206-44-0	Fluoranthene	2400.	U
129-00-0	Pyrene	2400.	U
85-68-7	Butylbenzylphthalate	2400.	U
91-94-1	3,3'-Dichlorobenzidine	4800.	U
56-55-3	Benzo(a)anthracene	2400.	U
218-01-9	Chrysene	2400.	U
117-81-7	bis(2-Ethylhexyl)phthalate	2400.	U
117-84-0	Di-n-octylphthalate	2400.	U
205-99-2	Benzo(b)fluoranthene	2400.	U
207-08-9	Benzo(k)fluoranthene	2400.	U
50-32-8	Benzo(a)pyrene	2400.	U
193-39-5	Indeno(1,2,3-cd)pyrene	2400.	U
53-70-3	Dibenz(a,h)anthracene	2400.	U
191-24-2	Benzo(g,h,i)perylene	2400.	U

000346

(1) - Cannot be separated from diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH14

Name: CENTRY   Contract: 68-W8-0078

Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

ix: (soil/water) SOIL   Lab Sample ID:

le wt/vol: 1.0 (g/mL) G   Lab File ID: A0980

l: (low/med) MED   Date Received: 5/10/89

isture: not dec. 5. dec. 0.   Date Extracted: 5/16/89

action: (SepF/Cont/Sonc) SONC   Date Analyzed: 5/18/89

Cleanup: (Y/N) N   pH: .0   Dilution Factor: 6.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	UG/KG	Q
108-95-2	Phenol	130000.	U
111-44-4	bis(2-Chloroethyl)ether	130000.	U
95-57-8	2-Chlorophenol	130000.	U
541-73-1	1,3-Dichlorobenzene	130000.	U
106-46-7	1,4-Dichlorobenzene	130000.	U
100-51-6	Benzyl alcohol	130000.	U
95-50-1	1,2-Dichlorobenzene	130000.	U
95-48-7	2-Methylphenol	130000.	U
39638-32-9	bis(2-Chloroisopropyl)ether	130000.	U
106-44-5	4-Methylphenol	130000.	U
621-64-7	N-Nitroso-di-n-propylamine	130000.	U
67-72-1	Hexachloroethane	130000.	U
98-95-3	Nitrobenzene	130000.	U
78-59-1	Isophorone	130000.	U
88-75-5	2-Nitrophenol	130000.	U
105-67-9	2,4-Dimethylphenol	130000.	U
65-85-0	Benzoic acid	630000.	U J
111-91-1	bis(2-Chloroethoxy)methane	130000.	U
120-83-2	2,4-Dichlorophenol	130000.	U
120-82-1	1,2,4-Trichlorobenzene	130000.	U
91-20-3	Naphthalene	130000.	U
106-47-8	4-Chloroaniline	130000.	U
87-68-3	Hexachlorobutadiene	130000.	U
59-50-7	4-Chloro-3-methylphenol	130000.	U
91-57-6	2-Methylnaphthalene	130000.	U
77-47-4	Hexachlorocyclopentadiene	130000.	U
88-06-2	2,4,6-Trichlorophenol	130000.	U
95-95-4	2,4,5-Trichlorophenol	630000.	U
91-58-7	2-Chloronaphthalene	130000.	U
88-74-4	2-Nitroaniline	630000.	U
131-11-3	Dimethylphthalate	130000.	U
208-96-8	Acenaphthylene	130000.	U
606-20-2	2,6-Dinitrotoluene	130000.	U

000375

1C

MIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH14

CENTRY   Contract: 68-W8-0078

: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

: (soil/water) SOIL   Lab Sample ID:

le wt/vol: 1.0 (g/mL) G   Lab File ID: A0980

el: (low/med) MED   Date Received: 5/10/89

oisture: not dec. 5. dec. 0.   Date Extracted: 5/16/89

raction: (SepF/Cont/Sonc) SONC   Date Analyzed: 5/18/89

Cleanup: (Y/N) N   pH: .0   Dilution Factor: 6.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	630000.	U
83-32-9	Acenaphthene	130000.	U
51-28-5	2,4-Dinitrophenol	630000.	U
100-02-7	4-Nitrophenol	630000.	U J
132-64-9	Dibenzofuran	130000.	U
121-14-2	2,4-Dinitrotoluene	130000.	U
84-66-2	Diethylphthalate	130000.	U
7005-72-3	4-Chlorophenyl-phenylether	130000.	U
86-73-7	Fluorene	130000.	U
100-01-6	4-Nitroaniline	630000.	U
534-52-1	4,6-Dinitro-2-methylphenol	630000.	U
86-30-6	N-Nitrosodiphenylamine (1)	130000.	U
101-55-3	4-Bromophenyl-phenylether	130000.	U
118-74-1	Hexachlorobenzene	130000.	U
87-86-5	Pentachlorophenol	630000.	U
85-01-8	Phenanthrene	130000.	U
120-12-7	Anthracene	130000.	U
84-74-2	Di-n-butylphthalate	130000.	U
206-44-0	Fluoranthene	130000.	U
129-00-0	Pyrene	130000.	U
85-68-7	Butylbenzylphthalate	130000.	U
91-94-1	3,3'-Dichlorobenzidine	250000.	U
56-55-3	Benzo(a)anthracene	130000.	U
218-01-9	Chrysene	130000.	U
117-81-7	bis(2-Ethylhexyl)phthalate	130000.	U
117-84-0	Di-n-octylphthalate	130000.	U
205-99-2	Benzo(b)fluoranthene	130000.	U
207-08-9	Benzo(k)fluoranthene	130000.	U
50-32-8	Benzo(a)pyrene	130000.	U
193-39-5	Indeno(1,2,3-cd)pyrene	130000.	U
53-70-3	Dibenz(a,h)anthracene	130000.	U
191-24-2	Benzo(g,h,i)perylene	130000.	U

000376

(1) - Cannot be separated from diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH15

Lab Name: CENTRY Contract: 68-W8-0078

Lab Code: CENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 1.0 (g/mL) G Lab File ID: A0983

Level: (low/med) MED Date Received: 5/10/89

% Moisture: not dec. 8. dec. 0. Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/18/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 6.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	130000.	U
111-44-4	bis(2-Chloroethyl)ether	130000.	U
95-57-8	2-Chlorophenol	130000.	U
541-73-1	1,3-Dichlorobenzene	130000.	U
106-46-7	1,4-Dichlorobenzene	130000.	U
100-51-6	Benzyl alcohol	130000.	U
95-50-1	1,2-Dichlorobenzene	130000.	U
95-48-7	2-Methylphenol	130000.	U
39638-32-9	bis(2-Chloroisopropyl)ether	130000.	U
106-44-5	4-Methylphenol	130000.	U
621-64-7	N-Nitroso-di-n-propylamine	130000.	U
67-72-1	Hexachloroethane	130000.	U
98-95-3	Nitrobenzene	130000.	U
78-59-1	Isophorone	130000.	U
88-75-5	2-Nitrophenol	130000.	U
105-67-9	2,4-Dimethylphenol	130000.	U
65-85-0	Benzoic acid	650000.	UJ
111-91-1	bis(2-Chloroethoxy)methane	130000.	U
120-83-2	2,4-Dichlorophenol	130000.	U
120-82-1	1,2,4-Trichlorobenzene	130000.	U
91-20-3	Naphthalene	130000.	U
106-47-8	4-Chloroaniline	130000.	U
87-68-3	Hexachlorobutadiene	130000.	U
59-50-7	4-Chloro-3-methylphenol	130000.	U
91-57-6	2-Methylnaphthalene	130000.	U
77-47-4	Hexachlorocyclopentadiene	130000.	U
88-06-2	2,4,6-Trichlorophenol	130000.	U
95-95-4	2,4,5-Trichlorophenol	650000.	U
91-58-7	2-Chloronaphthalene	130000.	U
88-74-4	2-Nitroaniline	650000.	U
131-11-3	Dimethylphthalate	130000.	U
208-96-8	Acenaphthylene	130000.	U
606-20-2	2,6-Dinitrotoluene	130000.	U

000401

1C
ATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH15

Contract: 68-W8-0079

Case No.: 11902 SAS No.: SDG No.: BAH08

ater) SOIL : Lab Sample ID:

1.0 (g/mL) G Lab File ID: A0983

med) MED Date Received: 5/10/89

. not dec. 8. dec. 0. Date Extracted: 5/16/89

ction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/18/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 6.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	650000.	U
83-32-9	Acenaphthene	130000.	U
51-28-5	2,4-Dinitrophenol	650000.	UJ
100-02-7	4-Nitrophenol	650000.	U
132-64-9	Dibenzofuran	130000.	U
121-14-2	2,4-Dinitrotoluene	130000.	U
84-66-2	Diethylphthalate	130000.	U
7005-72-3	4-Chlorophenyl-phenylether	130000.	U
86-73-7	Fluorene	130000.	U
100-01-6	4-Nitroaniline	650000.	U
534-52-1	4,6-Dinitro-2-methylphenol	650000.	U
86-30-6	N-Nitrosodiphenylamine (1)	130000.	U
101-55-3	4-Bromophenyl-phenylether	130000.	U
118-74-1	Hexachlorobenzene	130000.	U
87-86-5	Pentachlorophenol	650000.	U
85-01-8	Phenanthrene	130000.	U
120-12-7	Anthracene	130000.	U
84-74-2	Di-n-butylphthalate	130000.	U
206-44-0	Fluoranthene	130000.	U
129-00-0	Pyrene	130000.	U
85-68-7	Butylbenzylphthalate	130000.	U
91-94-1	3,3'-Dichlorobenzidine	260000.	U
56-55-3	Benzo(a)anthracene	130000.	U
218-01-9	Chrysene	130000.	U
117-81-7	bis(2-Ethylhexyl)phthalate	130000.	U
117-84-0	Di-n-octylphthalate	130000.	U
205-99-2	Benzo(b)fluoranthene	130000.	U
207-08-9	Benzo(k)fluoranthene	130000.	U
50-32-8	Benzo(a)pyrene	130000.	U
193-39-5	Indeno(1,2,3-cd)pyrene	130000.	U
53-70-3	Dibenz(a,h)anthracene	130000.	U
191-24-2	Benzo(g,h,i)perylene	130000.	U

(1) - Cannot be separated from diphenylamine

000402

U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH16

Lab Name: CENTRY Contract: 68-W8-0078

Lab Code: CENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) WATER Lab Sample ID:

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: A1030

Level: (low/med) LOW Date Received: 5/10/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 5/12/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/24/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10.	U
111-44-4	bis(2-Chloroethyl)ether	10.	U
95-57-8	2-Chlorophenol	10.	U
541-73-1	1,3-Dichlorobenzene	10.	U
106-46-7	1,4-Dichlorobenzene	10.	U
100-51-6	Benzyl alcohol	10.	U
95-50-1	1,2-Dichlorobenzene	10.	U
95-48-7	2-Methylphenol	10.	U
39638-32-9	bis(2-Chloroisopropyl)ether	10.	U
106-44-5	4-Methylphenol	10.	U
621-64-7	N-Nitroso-di-n-propylamine	10.	U
67-72-1	Hexachloroethane	10.	U
98-95-3	Nitrobenzene	10.	U
78-59-1	Isophorone	10.	U
88-75-5	2-Nitrophenol	10.	U
105-67-9	2,4-Dimethylphenol	10.	U
65-85-0	Benzoic acid	50.	U
111-91-1	bis(2-Chloroethoxy)methane	10.	U
120-83-2	2,4-Dichlorophenol	10.	U
120-82-1	1,2,4-Trichlorobenzene	10.	U
91-20-3	Naphthalene	10.	U
106-47-8	4-Chloroaniline	10.	U
87-68-3	Hexachlorobutadiene	10.	U
59-50-7	4-Chloro-3-methylphenol	10.	U
91-57-6	2-Methylnaphthalene	10.	U
77-47-4	Hexachlorocyclopentadiene	10.	U
88-06-2	2,4,6-Trichlorophenol	10.	U
95-95-4	2,4,5-Trichlorophenol	50.	U
91-58-7	2-Chloronaphthalene	10.	U
88-74-4	2-Nitroaniline	50.	U
131-11-3	Dimethylphthalate	10.	U
208-96-8	Acenaphthylene	10.	U
606-20-2	2,6-Dinitrotoluene	10.	UJ

000327

FORM I SV-1 1/87 Rev.

1C

ILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH16

CENTRY Contract: 68-W8-0078

CENTRY Case No.: 11902 SAS No.: SDG No.: BAH08

(soil/water) WATER Lab Sample ID:

e wt/vol: 1000.0 (g/mL) ML Lab File ID: A1030

evel: (low/med) LOW Date Received: 5/10/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 5/12/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/24/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50.	U
83-32-9	Acenaphthene	10.	U
51-28-5	2,4-Dinitrophenol	50.	U
100-02-7	4-Nitrophenol	50.	U
132-64-9	Dibenzofuran	10.	U
121-14-2	2,4-Dinitrotoluene	10.	U
84-66-2	Diethylphthalate	10.	U
7005-72-3	4-Chlorophenyl-phenylether	10.	U
86-73-7	Fluorene	10.	U
100-01-6	4-Nitroaniline	50.	U
534-52-1	4,6-Dinitro-2-methylphenol	50.	U
86-30-6	N-Nitrosodiphenylamine (1)	50.	U
101-55-3	4-Bromophenyl-phenylether	10.	U
118-74-1	Hexachlorobenzene	10.	U
87-86-5	Pentachlorophenol	50.	U
85-01-8	Phenanthrene	10.	U
120-12-7	Anthracene	10.	U
84-74-2	Di-n-butylphthalate	10.	U
206-44-0	Fluoranthene	10.	U
129-00-0	Pyrene	10.	U
85-68-7	Butylbenzylphthalate	10.	U
91-94-1	3,3'-Dichlorobenzidine	20.	U
56-55-3	Benzo(a)anthracene	10.	U
218-01-9	Chrysene	10.	U
117-81-7	bis(2-Ethylhexyl)phthalate	10.	U
117-84-0	Di-n-octylphthalate	10.	U
205-99-2	Benzo(b)fluoranthene	10.	U
207-08-9	Benzo(k)fluoranthene	10.	U
50-32-8	Benzo(a)pyrene	10.	U
193-39-5	Indeno(1,2,3-cd)pyrene	10.	U
53-70-3	Dibenz(a,h)anthracene	10.	U
191-24-2	Benzo(g,h,i)perylene	10.	U

(1) - Cannot be separated from diphenylamine

000428

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH17

Lab Name: CENTRY   Contract: 68-W8-0078

Lab Code: CENTRY   Case No.: 11902   SAS No.:   SDG No.: BAH08

Matrix: (soil/water) WATER   Lab Sample ID:

Sample wt/vol: 1000.0 (g/mL) ML   Lab File ID: A1049

Level: (low/med) LOW   Date Received: 5/10/89

% Moisture: not dec. 100. dec. 0.   Date Extracted: 5/12/89

Extraction: (SepF/Cont/Sonc) CONT   Date Analyzed: 5/26/89

GPC Cleanup: (Y/N) N   pH: .0   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10.	U
111-44-4	bis(2-Chloroethyl)ether	10.	U
95-57-8	2-Chlorophenol	10.	U
541-73-1	1,3-Dichlorobenzene	10.	U
106-46-7	1,4-Dichlorobenzene	10.	U
100-51-6	Benzyl alcohol	10.	U
95-50-1	1,2-Dichlorobenzene	10.	U
95-48-7	2-Methylphenol	10.	U
39638-32-9	bis(2-Chloroisopropyl)ether	10.	U
106-44-5	4-Methylphenol	10.	U
621-64-7	N-Nitroso-di-n-propylamine	10.	U
67-72-1	Hexachloroethane	10.	U
98-95-3	Nitrobenzene	10.	U
78-59-1	Isophorone	10.	U
88-75-5	2-Nitrophenol	10.	U
105-67-9	2,4-Dimethylphenol	10.	U
65-85-0	Benzoic acid	50.	U
111-91-1	bis(2-Chloroethoxy)methane	10.	U
120-83-2	2,4-Dichlorophenol	10.	U
120-82-1	1,2,4-Trichlorobenzene	10.	U
91-20-3	Naphthalene	10.	U
106-47-8	4-Chloroaniline	10.	U
87-68-3	Hexachlorobutadiene	10.	U
59-50-7	4-Chloro-3-methylphenol	10.	U
91-57-6	2-Methylnaphthalene	10.	U
77-47-4	Hexachlorocyclopentadiene	10.	U
88-06-2	2,4,6-Trichlorophenol	10.	U
95-95-4	2,4,5-Trichlorophenol	50.	U
91-58-7	2-Chloronaphthalene	10.	U
88-74-4	2-Nitroaniline	50.	U
131-11-3	Dimethylphthalate	10.	U
208-96-8	Acenaphthylene	10.	U
606-20-2	2,6-Dinitrotoluene	10.	U

000440

CS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH17

Contract: 68-W8-0078

RY Case No.: 11902 SAS No.: SDG No.: BAH08

l/water) WATER Lab Sample ID:

vol: 1000.0 (g/mL) ML Lab File ID: A1049

(low/med) LOW Date Received: 5/10/89

ure: not dec. 100. dec. 0. Date Extracted: 5/12/89

tion: (SepF/Cont/Sonc) CONT Date Analyzed: 5/26/89

PC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50.	U
83-32-9	Acenaphthene	10.	U
51-28-5	2,4-Dinitrophenol	50.	U
100-02-7	4-Nitrophenol	50.	U
132-64-9	Dibenzofuran	10.	U
121-14-2	2,4-Dinitrotoluene	10.	U
84-66-2	Diethylphthalate	10.	U
7005-72-3	4-Chlorophenyl-phenylether	10.	U
86-73-7	Fluorene	10.	U
100-01-6	4-Nitroaniline	50.	U
534-52-1	4,6-Dinitro-2-methylphenol	50.	U
86-30-6	N-Nitrosodiphenylamine (1)	50.	U
101-55-3	4-Bromophenyl-phenylether	10.	U
118-74-1	Hexachlorobenzene	10.	U
87-86-5	Pentachlorophenol	50.	U
85-01-8	Phenanthrene	10.	U
120-12-7	Anthracene	10.	U
84-74-2	Di-n-butylphthalate	.7	J
206-44-0	Fluoranthene	10.	U
129-00-0	Pyrene	10.	U
85-68-7	Butylbenzylphthalate	10.	U
91-94-1	3,3'-Dichlorobenzidine	20.	U
56-55-3	Benzo(a)anthracene	10.	U
218-01-9	Chrysene	10.	U
117-81-7	bis(2-Ethylhexyl)phthalate	.6	J
117-84-0	Di-n-octylphthalate	10.	U
205-99-2	Benzo(b)fluoranthene	10.	U
207-08-9	Benzo(k)fluoranthene	10.	U
50-32-8	Benzo(a)pyrene	10.	U
193-39-5	Indeno(1,2,3-cd)pyrene	10.	U
53-70-3	Dibenz(a,h)anthracene	10.	U
191-24-2	Benzo(g,h,i)perylene	10.	U

(1) - Cannot be separated from diphenylamine

FORM I SV-2

1/87 Rev.

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH08

Lab Name: NET-MA

Lab Code: NET-MA Case No.: 11902 SAS No.: Contract: 68-W8-0078 SDG No.: BAH08

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 1. (g/mL) G Lab File ID: C184A16A

Level: (low/med) MED Date Received: 5/10/89

% Moisture: not dec. 10. dec. 0. Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 6/ 7/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	130.	U
319-85-7	beta-BHC	130.	U
319-86-8	delta-BHC	130.	U
58-89-9	gamma-BHC (Lindane)	130.	U
76-44-8	Heptachlor	130.	U
309-00-2	Aldrin	130.	U
1024-57-3	Heptachlor epoxide	130.	U
959-98-8	Endosulfan I	130.	U
60-57-1	Dieldrin	270.	U
72-55-9	4,4'-DDE	270.	U
72-20-8	Endrin	270.	U
33213-65-9	Endosulfan II	270.	U
72-54-8	4,4'-DDD	270.	U
1031-07-8	Endosulfan sulfate	270.	U
50-29-3	4,4'-DDT	270.	U
72-43-5	Methoxychlor	1300.	U
53494-70-5	Endrin ketone	270.	U
5103-71-9	alpha-Chlordane	1300.	U
5103-74-2	gamma-Chlordane	1300.	U
8001-35-2	Toxaphene	2700.	U
12674-11-2	Aroclor-1016	1300.	U
11104-28-2	Aroclor-1221	1300.	U
11141-16-5	Aroclor-1232	1300.	U
53469-21-9	Aroclor-1242	1300.	U
12672-29-6	Aroclor-1248	1300.	U
11097-69-1	Aroclor-1254	2700.	U
11096-82-5	Aroclor-1260	2700.	U

000302

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH09

Lab Name: NET-MA Contract: 68-W8-0078

Lab Code: NET-MA Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 1. (g/mL) G Lab File ID: C184A19A

Level: (low/med) MED Date Received: 5/10/89

% Moisture: not dec. 16. dec. 0. Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 6/ 7/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	UG/KG	Q
319-84-6	alpha-BHC	140.	U
319-85-7	beta-BHC	140.	U
319-86-8	delta-BHC	140.	U
58-89-9	gamma-BHC (Lindane)	140.	U
76-44-8	Heptachlor	140.	U
309-00-2	Aldrin	200.	
1024-57-3	Heptachlor epoxide	140.	U
959-98-8	Endosulfan I	140.	U
60-57-1	Dieldrin	200.	J
72-55-9	4,4'-DDE	280.	U
72-20-8	Endrin	280.	U
33213-65-9	Endosulfan II	280.	U
72-54-8	4,4'-DDD	280.	U
1031-07-8	Endosulfan sulfate	280.	U
50-29-3	4,4'-DDT	280.	U
72-43-5	Methoxychlor	1400.	U
53494-70-5	Endrin ketone	280.	U
5103-71-9	alpha-Chlordane	28.	~~DJ~~
5103-74-2	gamma-Chlordane	1400.	U
8001-35-2	Toxaphene	2800.	U
12674-11-2	Aroclor-1016	1400.	U
11104-28-2	Aroclor-1221	1400.	U
11141-16-5	Aroclor-1232	1400.	U
53469-21-9	Aroclor-1242	1400.	U
12672-29-6	Aroclor-1248	1400.	U
11097-69-1	Aroclor-1254	2800.	U
11096-82-5	Aroclor-1260	2800.	U

000306

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH10

Lab Name: NET-MA Contract: 68-W8-0079

Lab Code: NET-MA Case No.: 11902 SAS No.: SDG No.: BAH09

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 1. (g/mL) G Lab File ID: C184A21A

Level: (low/med) MED Date Received: 5/10/89

% Moisture: not dec. 18. dec. 0. Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 6/ 7/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	150.	U
319-85-7	beta-BHC	150.	U
319-86-8	delta-BHC	150.	U
58-89-9	gamma-BHC (Lindane)	150.	U
76-44-8	Heptachlor	13.	~~BJ~~
309-00-2	Aldrin	150.	U
1024-57-3	Heptachlor epoxide	150.	U
959-98-8	Endosulfan I	150.	U
60-57-1	Dieldrin	290.	U
72-55-9	4,4'-DDE	290.	U
72-20-8	Endrin	290.	U
33213-65-9	Endosulfan II	290.	U
72-54-8	4,4'-DDD	290.	U
1031-07-8	Endosulfan sulfate	290.	U
50-29-3	4,4'-DDT	170.	~~BJ~~
72-43-5	Methoxychlor	1500.	U
53494-70-5	Endrin ketone	290.	U
5103-71-9	alpha-Chlordane	14.	~~BJ~~
5103-74-2	gamma-Chlordane	1500.	U
8001-35-2	Toxaphene	2900.	U
12674-11-2	Aroclor-1016	1500.	U
11104-28-2	Aroclor-1221	1500.	U
11141-16-5	Aroclor-1232	1500.	U
53469-21-9	Aroclor-1242	1500.	U
12672-29-6	Aroclor-1248	1500.	U
11097-69-1	Aroclor-1254	2900.	U
11096-82-5	Aroclor-1260	2900.	U

000034

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH12

Lab Name: NET-MA Contract: 68-W8-0078

Lab Code: NET-MA Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 1. (g/mL) G Lab File ID: C184A22A

Level: (low/med) MED Date Received: 5/10/89

% Moisture: not dec. 43. dec. 0. Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 6/ 7/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	210.	U
319-85-7	beta-BHC	210.	U
319-86-8	delta-BHC	210.	U
58-89-9	gamma-BHC (Lindane)	55.	J
76-44-8	Heptachlor	210.	U
309-00-2	Aldrin	140.	J
1024-57-3	Heptachlor epoxide	210.	U
959-98-8	Endosulfan I	210.	U
60-57-1	Dieldrin	420.	U
72-55-9	4,4'-DDE	420.	U
72-20-8	Endrin	420.	U
33213-65-9	Endosulfan II	420.	U
72-54-8	4,4'-DDD	420.	U
1031-07-8	Endosulfan sulfate	420.	U
50-29-3	4,4'-DDT	1400.	B
72-43-5	Methoxychlor	2100.	U
53494-70-5	Endrin ketone	420.	U
5103-71-9	alpha-Chlordane	2100.	U
5103-74-2	gamma-Chlordane	2100.	U
8001-35-2	Toxaphene	4200.	U
12674-11-2	Aroclor-1016	2100.	U
11104-28-2	Aroclor-1221	2100.	U
11141-16-5	Aroclor-1232	2100.	U
53469-21-9	Aroclor-1242	2100.	U
12672-29-6	Aroclor-1248	2100.	U
11097-69-1	Aroclor-1254	4200.	U
11096-82-5	Aroclor-1260	4200.	U

000621

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH13

me: NET-MA Contract: 68-W8-0078

de: NET-MA Case No.: 11902 SAS No.: SDG No.: BAH08

: (soil/water) SOIL Lab Sample ID:

e wt/vol: 1. (g/mL) G Lab File ID: C194A23A

: (low/med) MED Date Received: 5/10/89

sture: not dec. 17. dec. 0. Date Extracted: 5/16/89

action: (SepF/Cont/Sonc) SONC Date Analyzed: 6/ 7/89

Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG Q

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	140.	U
319-85-7	beta-BHC	140.	U
319-86-8	delta-BHC	140.	U
58-89-9	gamma-BHC (Lindane)	140.	U
76-44-8	Heptachlor	8.5	~~JB~~ JN
309-00-2	Aldrin	140.	U
1024-57-3	Heptachlor epoxide	140.	U
959-98-8	Endosulfan I	140.	U
60-57-1	Dieldrin	290.	U
72-55-9	4,4'-DDE	290.	U
72-20-8	Endrin	290.	U
33213-65-9	Endosulfan II	290.	U
72-54-8	4,4'-DDD	290.	U
1031-07-8	Endosulfan sulfate	290.	U
50-29-3	4,4'-DDT	230.	~~JB~~ N
72-43-5	Methoxychlor	1400.	U
53494-70-5	Endrin ketone	290.	U
5103-71-9	alpha-Chlordane	1400.	U
5103-74-2	gamma-Chlordane	1400.	U
8001-35-2	Toxaphene	2900.	U
12674-11-2	Aroclor-1016	1400.	U
11104-28-2	Aroclor-1221	1400.	U
11141-16-5	Aroclor-1232	1400.	U
53469-21-9	Aroclor-1242	1400.	U
12672-29-6	Aroclor-1248	1400.	U
11097-69-1	Aroclor-1254	2900.	U
11096-82-5	Aroclor-1260	2900.	U

000329

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH14

Lab Name: NET-MA

Contract: 68-W8-0078

Lab Code: NET-MA Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) SOIL

Lab Sample ID:

Sample wt/vol: 1. (g/mL) G

Lab File ID: C184A24A

Level: (low/med) MED

Date Received: 5/10/89

% Moisture: not dec. 5. dec. 0.

Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 6/ 7/89

GPC Cleanup: (Y/N) N pH: .0

Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	Concentration	Q
319-84-6	alpha-BHC	130.	U
319-85-7	beta-BHC	130.	U
319-86-8	delta-BHC	130.	U
58-89-9	gamma-BHC (Lindane)	130.	U
76-44-8	Heptachlor	130.	U
309-00-2	Aldrin	130.	U
1024-57-3	Heptachlor epoxide	130.	U
959-98-8	Endosulfan I	130.	U
60-57-1	Dieldrin	250.	U
72-55-9	4,4'-DDE	250.	U
72-20-8	Endrin	250.	U
33213-65-9	Endosulfan II	250.	U
72-54-8	4,4'-DDD	250.	U
1031-07-8	Endosulfan sulfate	250.	U
50-29-3	4,4'-DDT	260.	~~U~~ UJ
72-43-5	Methoxychlor	1300.	U
53494-70-5	Endrin ketone	250.	U
5103-71-9	alpha-Chlordane	1300.	U
5103-74-2	gamma-Chlordane	1300.	U
8001-35-2	Toxaphene	2500.	U
12674-11-2	Aroclor-1016	1300.	U
11104-28-2	Aroclor-1221	1300.	U
11141-16-5	Aroclor-1232	1300.	U
53469-21-9	Aroclor-1242	1300.	U
12672-29-6	Aroclor-1248	1300.	U
11097-69-1	Aroclor-1254	2500.	U
11096-82-5	Aroclor-1260	2500.	U

000335

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH15

Lab Name: NET-MA Contract: 68-W8-0078

Lab Code: NET-MA Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 1. (g/mL) G Lab File ID: C184A25A

Level: (low/med) MED Date Received: 5/10/89

% Moisture: not dec. 8. dec. 0. Date Extracted: 5/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 6/ 7/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	130.	U
319-85-7	beta-BHC	130.	U
319-86-8	delta-BHC	130.	U
58-89-9	gamma-BHC (Lindane)	130.	U
76-44-8	Heptachlor	130.	U
309-00-2	Aldrin	130.	U
1024-57-3	Heptachlor epoxide	130.	U
959-98-8	Endosulfan I	130.	U
60-57-1	Dieldrin	260.	U
72-55-9	4,4'-DDE	260.	U
72-20-8	Endrin	260.	U
33213-65-9	Endosulfan II	260.	U
72-54-8	4,4'-DDD	260.	U
1031-07-8	Endosulfan sulfate	260.	U
50-29-3	4,4'-DDT	43.	~~JBJ~~ UJ
72-43-5	Methoxychlor	1300.	U
53494-70-5	Endrin ketone	260.	U
5103-71-9	alpha-Chlordane	1300.	U
5103-74-2	gamma-Chlordane	1300.	U
8001-35-2	Toxaphene	2600.	U
12674-11-2	Aroclor-1016	1300.	U
11104-28-2	Aroclor-1221	1300.	U
11141-16-5	Aroclor-1232	1300.	U
53469-21-9	Aroclor-1242	1300.	U
12672-29-6	Aroclor-1248	1300.	U
11097-69-1	Aroclor-1254	2600.	U
11096-82-5	Aroclor-1260	2600.	U

000643

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH16

Lab Name: NET-MA

Contract: 68-W8-0078

Lab Code: NET-MA Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) WATER Lab Sample ID:

Sample wt/vol: 1000. (g/mL) ML Lab File ID: C184A28A

Level: (low/med) LOW Date Received: 5/10/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 5/12/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 6/ 7/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	.050	U
319-85-7	beta-BHC	.050	U
319-86-8	delta-BHC	.050	U
58-89-9	gamma-BHC (Lindane)	.050	U
76-44-8	Heptachlor	.050	U
309-00-2	Aldrin	.050	U
1024-57-3	Heptachlor epoxide	.050	U
959-98-8	Endosulfan I	.050	U
60-57-1	Dieldrin	.10	U
72-55-9	4,4'-DDE	.10	U
72-20-8	Endrin	.10	U
33213-65-9	Endosulfan II	.10	U
72-54-8	4,4'-DDD	.10	U
1031-07-8	Endosulfan sulfate	.10	U
50-29-3	4,4'-DDT	.10	U
72-43-5	Methoxychlor	.50	U
53494-70-5	Endrin ketone	.10	U
5103-71-9	alpha-Chlordane	.50	U
5103-74-2	gamma-Chlordane	.50	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	.50	U
11104-28-2	Aroclor-1221	.50	U
11141-16-5	Aroclor-1232	.50	U
53469-21-9	Aroclor-1242	.50	U
12672-29-6	Aroclor-1248	.50	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

000049

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BAH17

Lab Name: NET-MA Contract: 68-W8-0078

Lab Code: NET-MA Case No.: 11902 SAS No.: SDG No.: BAH08

Matrix: (soil/water) WATER Lab Sample ID:

Sample wt/vol: 1000. (g/mL) ML Lab File ID: C184A29A

Level: (low/med) LOW Date Received: 5/10/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 5/12/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 6/ 7/89

GPC Cleanup: (Y/N) N pH: .0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	-----alpha-BHC	.050	U
319-85-7	-----beta-BHC	.050	U
319-86-8	-----delta-BHC	.050	U
58-89-9	-----gamma-BHC (Lindane)	.050	U
76-44-8	-----Heptachlor	.050	U
309-00-2	-----Aldrin	.050	U
1024-57-3	-----Heptachlor epoxide	.050	U
959-98-8	-----Endosulfan I	.050	U
60-57-1	-----Dieldrin	.10	U
72-55-9	-----4,4'-DDE	.10	U
72-20-8	-----Endrin	.10	U
33213-65-9	-----Endosulfan II	.10	U
72-54-8	-----4,4'-DDD	.10	U
1031-07-8	-----Endosulfan sulfate	.10	U
50-29-3	-----4,4'-DDT	.061	J
72-43-5	-----Methoxychlor	.50	U
53494-70-5	-----Endrin ketone	.10	U
5103-71-9	-----alpha-Chlordane	.50	U
5103-74-2	-----gamma-Chlordane	.50	U
8001-35-2	-----Toxaphene	1.0	U
12674-11-2	-----Aroclor-1016	.50	U
11104-28-2	-----Aroclor-1221	.50	U
11141-16-5	-----Aroclor-1232	.50	U
53469-21-9	-----Aroclor-1242	.50	U
12672-29-6	-----Aroclor-1248	.50	U
11097-69-1	-----Aroclor-1254	1.0	U
11096-82-5	-----Aroclor-1260	1.0	U

000655

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBX451

Lab Name: LAUCKS TESTING LABS Contract: 68-W8-0014

Lab Code: LAUCKS Case No.: 11290 SAS No.: SDG No.: MBX451

Matrix (soil/water): SOIL Lab Sample ID: 14276-1

Level (low/med): LOW Date Received: 01/27/89

% Solids: 84.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	987			P
7440-36-0	Antimony	1.3	U	NJ	F
7440-38-2	Arsenic	~~0.77~~	~~B~~	~~[illegible]~~	F
7440-39-3	Barium	6.3	B		P
7440-41-7	Beryllium	0.17	U		P
7440-43-9	Cadmium	0.56	U		P
7440-70-2	Calcium	52700			P
7440-47-3	Chromium	2.8		J	P
7440-48-4	Cobalt	4.6	B		P
7440-50-8	Copper	8.1		*J	P
7439-89-6	Iron	3160			P
7439-92-1	Lead	47.1		S	F
7439-95-4	Magnesium	529	B		P
7439-96-5	Manganese	77.6		N*J	P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	3.3	U		P
7440-09-7	Potassium	189	U		P
7782-49-2	Selenium	0.30	U	NWJ	F
7440-22-4	Silver	0.36	U	N J	P
7440-23-5	Sodium	88.4	B		P
7440-28-0	Thallium	0.27	U	J	F
7440-62-2	Vanadium	2.6	B		P
7440-66-6	Zinc	~~40.2~~			P
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS, ROCKS, SHELLS.

FORM I - IN

7/87

Rev. IFB Amendment Date

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBX452

Lab Name: LAUCKS TESTING LABS   Contract: 68-W8-0014

Lab Code: LAUCKS   Case No.: 11290   SAS No.:   SDG No.: MBX451

Matrix (soil/water): SOIL   Lab Sample ID: 14276-2

Level (low/med): LOW   Date Received: 01/27/89

% Solids: 79.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	674			P
7440-36-0	Antimony	1.4	U	NJ	F
7440-38-2	Arsenic	~~0.80~~	~~B~~	~~J~~	F
7440-39-3	Barium	4.8	B		P
7440-41-7	Beryllium	0.17	U		P
7440-43-9	Cadmium	0.57	U		P
7440-70-2	Calcium	1950			P
7440-47-3	Chromium	3.7		J	P
7440-48-4	Cobalt	3.7	U		P
7440-50-8	Copper	6.9		*J	P
7439-89-6	Iron	22000			P
7439-92-1	Lead	35.7		E	P
7439-95-4	Magnesium	184	B		P
7439-96-5	Manganese	115		N*J	P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	9.4			P
7440-09-7	Potassium	195	U		P
7782-49-2	Selenium	0.32	U	NWJ	F
7440-22-4	Silver	0.37	U	N J	P
7440-23-5	Sodium	22.5	B		P
7440-28-0	Thallium	0.28	U	J	F
7440-62-2	Vanadium	7.0	B		P
7440-66-6	Zinc	84.6			P
	Cyanide				NR

Color Before: GREY   Clarity Before: Texture: COARSE

Color After: BROWN   Clarity After: Artifacts: YES

Comments:
ROOTS, ROCKS.

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX453

Lab Name: LAUCKS TESTING LABS   Contract: 68-W8-0014

Lab Code: LAUCKS   Case No.: 11290   SAS No.:   SDG No.: MBX451

Matrix (soil/water): SOIL   Lab Sample ID: ~~14276~~-3 - [illegible]

Level (low/med): LOW   Date Received: 01/27/89

% Solids: 75.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	725			P
7440-36-0	Antimony	1.4	U	NJ	F
7440-38-2	Arsenic	~~1.6~~	~~B~~	~~[illegible]~~	F
7440-39-3	Barium	2.1	U		P
7440-41-7	Beryllium	0.18	U		P
7440-43-9	Cadmium	0.58	U		P
7440-70-2	Calcium	601	B		P
7440-47-3	Chromium	1.8			P
7440-48-4	Cobalt	3.8	U		P
7440-50-8	Copper	6.0		*J	P
7439-89-6	Iron	5100			P
7439-92-1	Lead	31.8		E	P
7439-95-4	Magnesium	152	B		P
7439-96-5	Manganese	26.6		N*J	P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	3.5	U		P
7440-09-7	Potassium	198	U		P
7782-49-2	Selenium	1.7	U	NWJ	F
7440-22-4	Silver	0.37	U	N J	P
7440-23-5	Sodium	23.6	B		P
7440-28-0	Thallium	0.30	U	J	F
7440-62-2	Vanadium	5.2	B		P
7440-66-6	Zinc	~~[illegible]~~			P
	Cyanide				NR

Color Before: GREY   Clarity Before: Texture: COARSE

Color After: BROWN   Clarity After: Artifacts: YES

Comments:

ROOTS, ROCKS, LEAVES.

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX454

Lab Name: LAUCKS TESTING LABS Contract: 68-W8-0014

Lab Code: LAUCKS Case No.: 11290 SAS No.: SDG No.: MBX451

Matrix (soil/water): SOIL Lab Sample ID: 14276-4

Level (low/med): LOW Date Received: 01/27/89

% Solids: 73.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	282			P
7440-36-0	Antimony	8.1	U	N J	F
7440-38-2	Arsenic	~~0.65~~	~~U~~	~~W~~	F
7440-39-3	Barium	2.4	U		P
7440-41-7	Beryllium	0.22	B		P
7440-43-9	Cadmium	0.68	U		P
7440-70-2	Calcium	449	B		P
7440-47-3	Chromium	0.97	U		P
7440-48-4	Cobalt	4.4	U		P
7440-50-8	Copper	4.9	B	* J	P
7439-89-6	Iron	4080			P
7439-92-1	Lead	15.2			F
7439-95-4	Magnesium	95.3	B		P
7439-96-5	Manganese	23.9		N* J	P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	4.0	U		P
7440-09-7	Potassium	231	U		P
7782-49-2	Selenium	1.9	U	NW J	F
7440-22-4	Silver	0.43	U	N J	P
7440-23-5	Sodium	267	B		P
7440-28-0	Thallium	0.33	U	J	F
7440-62-2	Vanadium	3.0	U		P
7440-66-6	Zinc	~~69.8~~			P
	Cyanide				NR

Color Before: GREY Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts: YES

Comments:
ROOTS, LEAVES, BARKS, ROCK.

FORM I - IN

 7/87
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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBX455

Lab Name: LAUCKS TESTING LABS   Contract: 68-W8-0014

Lab Code: LAUCKS   Case No.: 11290   SAS No.:   SDG No.: MBX451

Matrix (soil/water): SOIL   Lab Sample ID: 14276-5

Level (low/med): LOW   Date Received: 01/27/89

% Solids: 79.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2490			P
7440-36-0	Antimony	1.5	U	N J	F
7440-38-2	Arsenic	~~0.67~~	~~B~~	~~J~~	F
7440-39-3	Barium	20.4	B		P
7440-41-7	Beryllium	0.30	B		P
7440-43-9	Cadmium	0.63	U		P
7440-70-2	Calcium	737	B		P
7440-47-3	Chromium	17.1			P
7440-48-4	Cobalt	4.1	U		P
7440-50-8	Copper	114		* J	P
7439-89-6	Iron	6300			P
7439-92-1	Lead	72.3		E	P
7439-95-4	Magnesium	126	B		P
7439-96-5	Manganese	20.3		N* J	P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	3.7	U		P
7440-09-7	Potassium	214	U		P
7782-49-2	Selenium	1.7	U	N J	F
7440-22-4	Silver	0.40	U	N J	P
7440-23-5	Sodium	86.1	B		P
7440-28-0	Thallium	0.30	U	J	F
7440-62-2	Vanadium	32.0		J	P
7440-66-6	Zinc	51.5			P
	Cyanide				NR

Color Before: GREY   Clarity Before: Texture: COARSE

Color After: BROWN   Clarity After: Artifacts: YES

Comments:
ROOTS, BARK, LEAVES.

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX456

Lab Name: LAUCKS TESTING LABS Contract: 68-W8-0014

Lab Code: LAUCKS Case No.: 11290 SAS No.: SDG No.: MBX451

Matrix (soil/water): SOIL Lab Sample ID: 14276-6

Level (low/med): LOW Date Received: 01/27/89

% Solids: 75.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	384			P
7440-36-0	Antimony	1.5	U	N J	F
7440-38-2	Arsenic	~~[illegible]~~			F
7440-39-3	Barium	49.3			P
7440-41-7	Beryllium	0.19	U		P
7440-43-9	Cadmium	0.63	U		P
7440-70-2	Calcium	491	B		P
7440-47-3	Chromium	1.6	B		P
7440-48-4	Cobalt	4.1	U		P
7440-50-8	Copper	34.8		*J	P
7439-89-6	Iron	16200			P
7439-92-1	Lead	721		E	P
7439-95-4	Magnesium	168	B		P
7439-96-5	Manganese	70.6		N*J	P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	3.7	U		P
7440-09-7	Potassium	214	U		P
7782-49-2	Selenium	1.8	U	NWJ	F
7440-22-4	Silver	0.40	U	N J	P
7440-23-5	Sodium	1560			P
7440-28-0	Thallium	0.31	U	J	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	64.4			P
	Cyanide				NR

Color Before: BLACK Clarity Before: Texture: COARSE

Color After: BLACK Clarity After: Artifacts: YES

Comments:
ROOTS, BARK, LEAVES.

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBX457

Lab Name: LAUCKS TESTING LABS Contract: 68-W8-0014

Lab Code: LAUCKS Case No.: 11290 SAS No.: SDG No.: MBX451

Matrix (soil/water): SOIL Lab Sample ID: 14276-7

Level (low/med): LOW Date Received: 01/27/89

% Solids: 73.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	360			P
7440-36-0	Antimony	1.6	U	N J	F
7440-38-2	Arsenic	~~2.0~~		~~J~~	F
7440-39-3	Barium	49.5			P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.66	U		P
7440-70-2	Calcium	380	B		P
7440-47-3	Chromium	1.4	B		P
7440-48-4	Cobalt	4.2	U		P
7440-50-8	Copper	27.7		* J	P
7439-89-6	Iron	16500			P
7439-92-1	Lead	579		E	P
7439-95-4	Magnesium	175	B		P
7439-96-5	Manganese	74.8		N* J	P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	3.9	U		P
7440-09-7	Potassium	222	U		P
7782-49-2	Selenium	1.8	U	NW J	F
7440-22-4	Silver	0.42	U	N J	P
7440-23-5	Sodium	1490			P
7440-28-0	Thallium	0.32	U	J	F
7440-62-2	Vanadium	2.9	B		P
7440-66-6	Zinc	~~43.9~~			P
	Cyanide				NR

Color Before: BLACK Clarity Before: Texture: COARSE

Color After: BLACK Clarity After: Artifacts: YES

Comments:
ROOTS, BARK, LEAVES.

013

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBX458

Lab Name: LAUCKS TESTING LABS Contract: 68-W8-0014

Lab Code: LAUCKS Case No.: 11290 SAS No.: SDG No.: MBX451

Matrix (soil/water): WATER Lab Sample ID: 14276-8

Level (low/med): LOW Date Received: 01/27/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

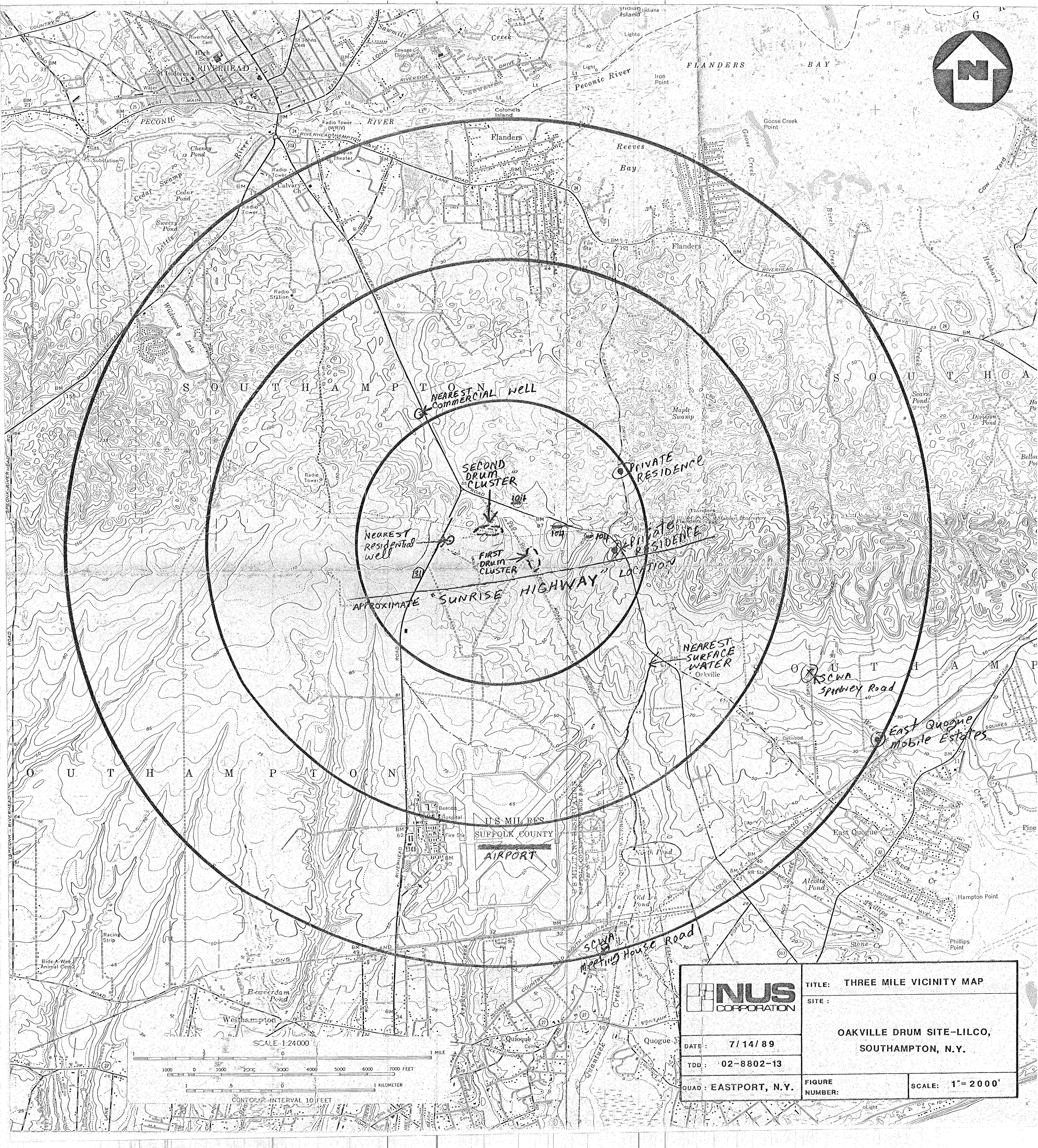
CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	47.4	U		P
7440-36-0	Antimony	7.9	U		F
7440-38-2	Arsenic	3.1	U		F
7440-39-3	Barium	11.6	U		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	3.3	U		P
7440-70-2	Calcium	164	B		P
7440-47-3	Chromium	4.7	U		P
7440-48-4	Cobalt	27.3	B		P
7440-50-8	Copper	9.1	B		P
7439-89-6	Iron	15.6	U		P
7439-92-1	Lead	1.0	U	J	F
7439-95-4	Magnesium	287	U		P
7439-96-5	Manganese	3.6	U		P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	19.5	U		P
7440-09-7	Potassium	1120	U		P
7782-49-2	Selenium	1.8	U		F
7440-22-4	Silver	2.1	U		P
7440-23-5	Sodium	54.4	U		P
7440-28-0	Thallium	1.6	U	J	F
7440-62-2	Vanadium	14.5	U		P
7440-66-6	Zinc	46.9			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

REFERENCE NO. 12



NEAREST COMMERCIAL WELL
SECOND DRUM CLUSTER
NEAREST residential well
FIRST DRUM CLUSTER
PRIVATE RESIDENCE
PRIVATE RESIDENCE
APPROXIMATE "SUNRISE HIGHWAY" LOCATION
NEAREST SURFACE WATER
SCWA Spinney Road
East Quogue Mobile Estates
SCWA Meeting House Road
RIVERHEAD
FLANDERS BAY
Flanders
Reeves Bay
SOUTHAMPTON
Oakville
U.S. MIL RES
SUFFOLK COUNTY AIRPORT
East Quogue
Westhampton
Quogue
SCALE 1:24000
CONTOUR INTERVAL 10 FEET
NUS CORPORATION
TITLE: THREE MILE VICINITY MAP
SITE: OAKVILLE DRUM SITE-LILCO, SOUTHAMPTON, N.Y.
DATE: 7/14/89
TDD: 02-8802-13
QUAD: EASTPORT, N.Y.
FIGURE NUMBER:
SCALE: 1"=2000'

REFERENCE NO. 13


N
DRUM Cluster 2
DRUM Cluster 1
SUNRISE HIGHWAY